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THE COMMAND AND GENERAL STAFF SCHOOL QUARTERLY

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CONTENTS

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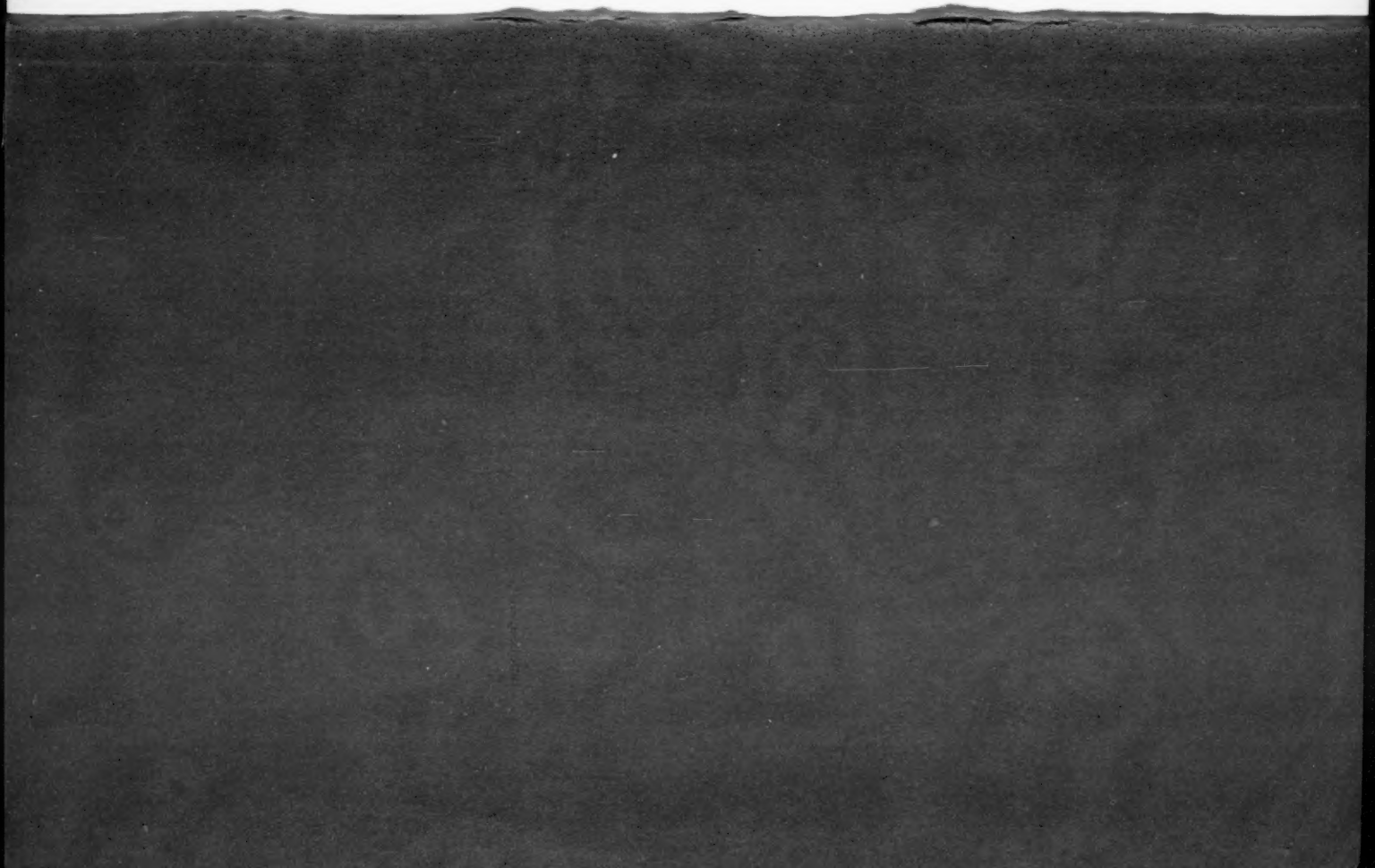

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REVIEW OF MILITARY LITERATURE

THE COMMAND AND GENERAL STAFF SCHOOL QUARTERLY

FOREWORD

The object of this publication is a systematic review of current military literature, through cataloging articles of professional value, in selected military and naval periodicals, in the domestic and foreign field.

Articles from foreign periodicals are treated by translations of titles and digests of contents; material of particular importance is covered more extensively in a Section of "Abstracts of Foreign-language Articles."

A "Book Review" Section contains reviews of outstanding books, recently accessioned, which are of particular professional significance.

This material is published as a guide to modern military tendencies and to inspire vigorous thought on the subjects treated.

The opinions expressed by authors are not necessarily official.

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Major C.A. Willoughby, Editor

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THE COMMAND AND GENERAL STAFF SCHOOL PRESS

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MAJOR C.A. WILLOUGHBY
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A—Foreign-Language Periodicals; B—English-Language Periodicals; C—Abstracts of Foreign-Language Articles; D—Foreign-Language Book Reviews; E—English-Language Book Reviews; F—Original Studies.

Lt.Col. N.B. Briscoe: *Revue de Cavalerie* (January-February 1934).

Maj. P.C. Bullard: *Revue de Génie Militaire* (January-February 1934).

Capt. F. During: *Bulletin Belge des Sciences Militaires* (November, December 1933); *Esercito e Nazione* (October, November, December 1933); *Militärwissenschaftliche Mitteilungen* (November, December 1933); *Militär-Wochenblatt* (11 December 1933-4 March 1934, inclusive); *Revue d'Artillerie* (November, December 1933); *Revue d'Infanterie* (October, November 1933); *Rivista di Artiglieria e Genio* (October, November, December 1933); *Wehr und Waffen* (October, November, December 1933); *Wissen und Wehr* (December 1933, January 1934).

1st Lieut. M.D. Taylor: *Revista del Ejercito y de la Marina* (November, December 1933, January 1934); *Revue des Forces Aeriennes* (October, November, December 1933).

Maj. C.A. Willoughby: *Revue Militaire Francaise* (November, December 1933).

Section 1

ABSTRACTS OF FOREIGN-LANGUAGE ARTICLES

This Section contains abstracts of selected articles from foreign military periodicals. Section 1 is designed to cover articles regarded as important; the remaining articles for each magazine are listed in Section 3.

CONTENTS

CAN WE STILL HAVE A "CANNAE"?

By Captain Fred During, Infantry

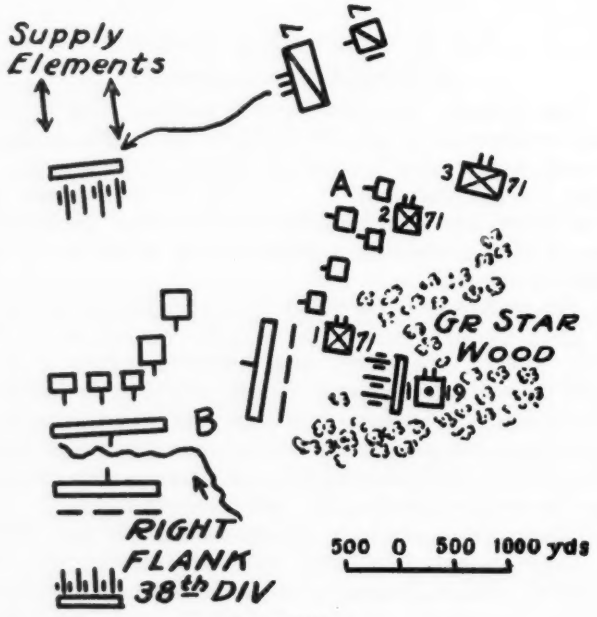
The German Field Service Regulations state in part: "The envelopment of one or both flanks and an attack against the rear of an enemy is especially effective. In this way an enemy may be destroyed." . . . "But we must assure ourselves, where, and if an envelopment is possible. An envelopment in conjunction with a strong frontal attack is the best means of success."

The soundness of the above doctrine has been proven by the great German leaders of the past, viz., Frederick the Great, Moltke (the elder), and Schlieffen. They were in accord that an envelopment is the best way not only to defeat, but to destroy, an enemy. It is often said that envelopments are too time-consuming, but experience has shown that frontal attacks are more time-consuming (and more costly in lives) than the apparently time-consuming envelopments.

Opponents of the wide envelopment argue that during the entire World War, only one such envelopment was successful—that of Tannenberg at the beginning of the War—and that Tannenberg was the end of the "Cannae" era. What about the winter battles at the Masurian Lakes from 7-22 February, 1915, which, in situation and results, were some-

Abstracted from: Militär-Wochenblatt, 11 February 1934. "Ist der Cannä-Gedanke noch zeitgemäsz?" By Lieutenant General E. Fleck, Retired

what similar to Tannenberg? The surprised enemy felt the pincers closing in. Several larger units, among them the entire Russian Artillery which had been in front of Lötzen, escaped, but four Russian divisions (92,000 men, 300 field pieces) laid down their arms in the woods at Augustowo. It is true this result was not like the result at Tannenberg, but the difficulty of advance over ice and snow and the attitude of the high command were responsible for that. Similar operations took place in 1914 on the Sambre and at Lodz, and in 1915 at Wilna and in Serbia, etc. Above all, had the Schlieffen plan been executed by a man who believed in the "destruction" of an enemy, the world might have witnessed the greatest "Cannae" in history.



SKETCH No. 1

Changes in tactics and technique is given by some as the reason the "Cannae idea" is a thing of the past. They do not refer to the war of stabilization, but to the changes

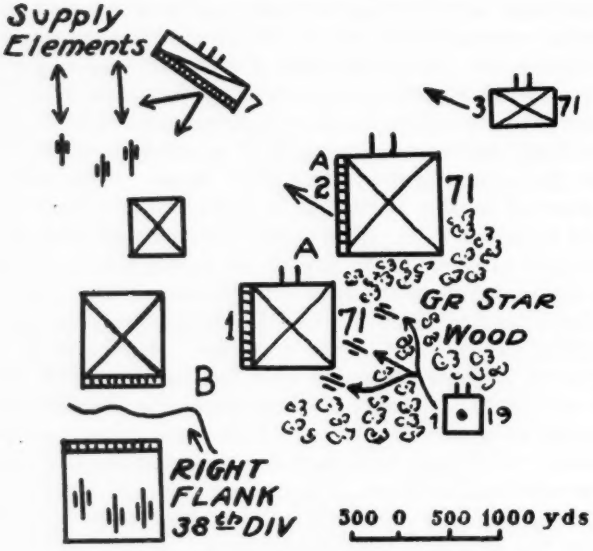
which the motor has brought about. Whether or not this important question is true can only be ascertained when we compare the situation of an enemy's rear and flank in Schlieffen's time with the possibilities of the present.

Schlieffen unfortunately did not see the World War; therefore we shall take a scene from a maneuver which took place in 1900 and compare it with a scene from a maneuver of our time, using the same terrain and situation, but using weapons and tactics in use at the time of the maneuver.

Sketch No. 1 shows the flank of a Red division which has been attacked by the Blue 38th Division. The Blue 71st Infantry, reinforced by the 7th Cavalry and the 1st Battalion 19th Field Artillery returning from a special mission, met weak Red cavalry in the "Great Star" forest. After destroying the Red cavalry at "A," Blue decided to attack the flank of the surprised Reds. During the development, Blue found opportune targets for the fire of its infantry and artillery. The 1st Battalion of the Blue 71st Infantry placed defiladed fire into the Red firing line at "B," which line could easily be distinguished by the dark uniforms. Red platoons and companies in closer formation were seen in rear of the firing line, and after the firing of the Blue began, the Reds hurriedly extended their front to the east, under heavy fire from Blue artillery. At the same time, the Blue cavalry regiment advanced north with the intention of attacking the Red Artillery in rear, which thereby was forced to face about to protect itself against the cavalry. After the successful cavalry attack, the 71st Infantry attacked with two battalions, while the 38th Division pushed the attack along the entire front, resulting in the rolling up of the Red lines, which were then again attacked by the cavalry. Had this been real war instead of a maneuver, the trains of the Red force would have become involved: a little "Cannae," the way Schlieffen had planned and taught in a large way.

If we now compare this maneuver of 1900 with a maneuver of our times (see Sketch No. 2), assuming that the enemy was also surprised, we find a difference. On account of the need of more maneuver room, the battlefield is larger. A battalion, which in 1900 occupied between 300 and 400 yards width and depth now occupies about a square of 1,000 yards. The artillery which formerly fought side by side, is now placed

here and there according to cover and terrain. Instead of cavalry attacks in close formations, we find cavalry on a large front with machine guns and artillery. The present field uniform is hardly visible; we see small groups of men and tanks appear here and there in the smoke of the battlefield; above it there is probably another combat in the air.



SKETCH NO. 2

What lessons can we learn from the changes of thirty years? Primarily, it is necessary to make a wider envelopment in order to attack the enemy's rear and flank. This wide envelopment involves two distinct disadvantages or dangers: first, leaders of the enveloping forces may turn too early, and in so doing they may find themselves opposite a newly formed front of the enemy; and second, there is the constant danger of detection by enemy aircraft. This latter would prevent the intended surprise. These disadvantages can be greatly minimized by the use of fast moving (motorized) troops, and the protection of the moving columns by aviation. The use of smoke is not recommended, as smoke is not con-

stant and smoke under such conditions may lead to an earlier detection of our plan.

According to opponents of this movement, another objection against the wide envelopment is found on the battlefield itself. The long lines of riflemen and their reserves which, in the old days, being held in close formation made such good targets, have disappeared, as have the artillery position of old and the long columns of trains, etc. Now hardly anything can be seen from the front or flank. Nevertheless, the positions of the heavy artillery, movements of staffs and orderlies at the different headquarters, and the system of supply, evacuation, etc., in a war of movement, can not be completely camouflaged. This fact has been proven by actual maneuvers of large units, where everything was conducted according to war. It has also been proven that a wide envelopment attacking the enemy in flank and especially in rear, completely disrupts the enemy's lines of communication. How will the enemy react at the appearance of fast moving, motorized, and mechanized troops? Views differ here. General Reinhardt thought that the enemy will use motorized units, at such points, from which they could close all avenues of approach to the flanks and rear. Other tacticians, especially the fanatical exponents of the tanks, believe that flanks and rears disappear as soon as motorized units of both armies meet and start a new front. This idea presupposes that friend and foe are completely motorized. It is very doubtful whether this will be true for some time. The infantry and artillery are still the two arms which will engage in a struggle along wide fronts for the possession of some terrain, etc. Motorized units will be found on such flanks, where the high command seeks the decision. Supported by cavalry, strong in firepower, and aviation, infantry, and artillery, these units will try by frontal attacks to open a wedge or create a suitable flank for an envelopment. To be as strong as possible at such decisive points must be the desire of the high command. The numerous trucks which are now available will greatly aid in this, and, when units become available from other parts of the front, the trucks may be used to move these units to a flank for the final blow. The mission of these units must be to attack in flank and rear of the enemy, and of preventing the enemy's withdrawal. Aviation and tanks, by the gassing of selected

areas, must disrupt the lines of communication far in rear. In this way, the entire battlefield will be closed and the position of the enemy becomes precarious. The supply of rations, etc., will not last longer than three days, and the supply of ammunition, which does not allow any interruption in modern times, will soon be exhausted.

Of course the enemy will try to take desperate chances of breaking this encirclement but, by proper planning, we can prevent this. In this way the mission of a wide envelopment may be accomplished, not in a rapid way, as before, but with more deliberation, and with complete destruction or surrender of the enemy, as at Tannenberg.

In order to obtain such a victory it is imperative that all military men be inculcated with the idea of the wide envelopment. They must believe in the success of such an envelopment. Tactics and technique may change but the idea of a "Cannae" will be with us, as long as we have armies.

THE EVOLUTION OF MODERN CAVALRY

By Major C.A. Willoughby, Infantry

Cavalry, during the past twenty years, has undergone profound changes in both its organization and employment. These changes were the logical consequences of progress, but their imperative necessity has perhaps escaped the attention of those who have imagined that the days of cavalry would be over when the effect of modern fire would oblige it to give up mounted attacks.

The organization of cavalry had for its object the solution of requirements which have confronted the command at all times in the conduct of active operations:

(a) Primarily, to be informed.
(b) To maintain freedom of action.
(c) To be able to assemble within a minimum of time the maximum means on any decisive point.

In view of its very object, the first requirement of this organization had to be *Mobility*, because:

Abstracted from: Revue Militaire Francaise, November 1933. "La cavalerie moderne et son évolution."

Information is only valuable when it is received in time.

Security is only effective when it is at some distance.

The assembly of means of action on a decisive point is only fully effective as an element of surprise.

The second requirement is *Force*, because: obtaining of information, insuring security, and participation in battle, have always involved overcoming the enemy's resistance or checking his attacks.

For centuries the horse, which insured to this organization both mobility and force, was a means of action of such vital importance that this organization was named after it. It was called "cavalry."

The day when fire rendered mounted shock action impossible, the horse became merely a means of maneuver and, in spite of its offensive spirit, in spite of the powerful means of fire with which it had been equipped, cavalry lost the offensive power it had enjoyed in the past because it was not able to cross or overcome the destructive fire of the adversary.

The horse itself has become an inadequate means of maneuver where the cavalry has missions to perform in connection with infantry divisions which are using motorized means in their movements.

The transformations which cavalry has undergone in the last twenty years in order to adapt itself to modern warfare, were influenced by miscellaneous factors, material—such as the development of technique (armament, liaison, transport), and moral factors—such as the memory of a long war of stabilization, as well as the spirit of the traditions of the arm. These transformations were incomplete or belated until the day when the irresistable law of progress made them compulsory.

It is possible to follow characteristics of the changes undergone by cavalry since 1914 by dividing this study into three important phases, each resulting from special causes and each presenting some particular characteristics.

These phases are as follows:

(1) *Evolution of the cavalry from 1914 until 1925.*—Lessons of the war—the destructive power of fire—Cavalry forsakes mounted combat to adopt fire combat.

(2) *Evolution of the cavalry from 1925 until 1930.*—The crisis of effectives. Technical progress enables the cavalry to develop its maneuvering ability through reinforcing it with dismounted combatants, i.e., the "dragons portés"; technical progress facilitates the obtaining of information by the use of armored cars.

(3) *Evolution of the cavalry from 1930 to 1933.*—The necessity of closely combining the horse and the machine becomes more and more apparent if cavalry is to be in a position to fulfill its missions. Such combined action is affected by the new cavalry organization.

A study of the transformation undergone by cavalry since 1914 will permit us to determine the tendency of the cavalry in the future; it must be borne in mind, however, that such organization can remain as such only for a limited period in view of constant evolution.

Evolution of the Cavalry from 1914 to 1925

The cavalry of 1914 had been organized and trained especially with a view to mounted action.

The information gathered on the tendencies of the German cavalry, a critical study of Germany's last maneuvers, justified the belief that in the beginning of operations the enemy armies would be protected and informed by powerful masses of cavalry which would endeavor to overcome enemy cavalry in shock action. Therefore, it seemed logical to organize the cavalry for rapid mounted maneuver, setting aside anything which might weigh it down, to arm it with a lance in view of shock action, and to develop that offensive spirit and that desire to charge the opponent which in the past had constituted one of its best factors of success.

All cavalrymen had a carbine, but their means of collective fire were limited to two machine guns per brigade. The artillery, reduced to a battalion of three batteries per division, was in no way adequate in view of the extended fronts on which the division might have to fight. The four hundred rifles of the Cyclist-Group constituted but a small support for the six mounted regiments of the Division.

Facts proved to be very different from what had been foreseen. Cavalry combats were limited in the beginning to

patrol encounters. Soon afterwards, these patrols no longer encountered cavalrymen armed with sabers or lances, but riflemen ambushed on the edge of woods or at the entrance of villages. Mounted action was paralyzed by fire-power.

Certainly the lack of appreciation of fire-power was a serious mistake, but it must not be overlooked that the offensive spirit of the French cavalry, its eagerness for mounted combat, the dash and energy of its cavalrymen, and its self-confidence certainly had a moral influence on German cavalry which paralyzed the latter for the remainder of the war and prevented it from daring to go ahead under circumstances such that its intervention might have been fruitful.

There was no pursuit after Charleroi and, in 1918, at the time of the offensive in April-May, the German cavalry remained inactive in rear of its infantry. This result alone had an influence on operations as a whole which sometimes has not been fully appreciated.

Cavalry, after a few successful patrol engagements, was obliged in the first weeks of the war to give up mounted action and fight dismounted. In Flanders, on the Yser, it fought side by side with the infantry. Subjected to the same hardships, it demanded the same equipment; cavalrymen were given a bayonet, intrenching tools, grenades, automatic rifles, and the number of their machine guns was doubled. They soon gave up their headgear to adopt that of the infantry, together with its equipment. In this severe school, the cavalry acquired, together with due appreciation of the power of fire, a more accurate idea of the power of resistance insured by rapid fire weapons in defensive operations.

The endeavor to become too closely identified with infantry combat formations resulted in cavalry overlooking the advantages it could derive from the mobility of its horses in maneuvering its regiments which were the equivalent of an infantry battalion. It seemed as though the heyday of cavalry was over, and even among cavalrymen themselves—immobilized for months in the trenches—there were some who doubted the future of their arm. Nevertheless, the High Command deemed it advisable to maintain large cavalry units, either to exploit the expected success, or to meet any emergency.

The attempts to break through the lines in 1915 and in 1917 fostered the hopes of the cavalry. However, it had to wait until the German offensive of 1918 for an opportunity of testing its mobility and resisting power; and the war was ended before it had a real chance to take part in any offensive operations on the Western Front.

The important lessons to be learned by cavalry from the war may be summed up as follows:

(1) The destructive power of fire renders mounted shock action henceforth impossible.

(2) Automatic fire-arms insure to cavalry a defensive power it did not have in the past; however, its offensive power remains limited because it can not break through the hostile barrage.

(3) Its mobility enables it to maneuver rapidly over extended fronts.

One principle was affirmed: Cavalry maneuvers mounted and fights with fire arms.

The organization of cavalry was influenced by these lessons. Primarily it endeavored to increase its fire power. The Cavalry Regiment was equipped with forty-eight automatic rifles and eight machine guns. The Division, which has four hundred automatic weapons, has at its disposal two battalions of horse artillery, one battalion of cyclists, and three squadrons of armored cars.

The means of action of cavalry become more and more identical with those of the infantry. *Some believe that mobility should constitute the only difference between cavalry and infantry.* This new conception is embodied in the name given the Cavalry Division, viz., "Light Division," to distinguish it from the Infantry Division which becomes "The Line Division."

The doctrine of its use, as contained in Regulations, was based upon the important missions of the arm: "Cavalry informs, protects and fights in liaison with the other arms"; it recognizes the predominant value of fire-power; it affirms the "special aptitude of cavalry to maneuver," and the necessity for rapid action; it develops successfully regulations for defensive combat and delaying action, but, owing to the inadequate artillery of the cavalry, it does not contemplate offensive operations except on limited fronts.

Evolution of the Cavalry from 1925 to 1930

The reduction in the length of compulsory service and the resulting considerable reduction in effectives, force the cavalry to modify its organization. Army corps and divisional reconnaissance groups had to have the minimum cadres indispensable for their mobilization, while the High Command had to have available a prescribed number of cavalry divisions.

The developments in automobiles and cross-country cars, provided a successful solution of the problem by reducing the number of mounted regiments to four per division, and reinforcing each division by a regiment of "Dragons-Portés" of three battalions, only one of which is constituted in time of peace.

The cavalry had already adopted the armored car as a means of reconnaissance. Henceforth it was to adopt the non-armored but cross-country car as a means of maneuver. The combination of the horse and machine which, in principle, should permit the cavalry division to have its mounted regiments followed up by a powerful reserve of dismounted combatants, was to have a far-reaching influence on the evolution of the entire arm.

The spirit of each arm is derived from the special work assigned to it. The infantryman, accustomed to maneuver and fight afoot, considers the motors as a means of transportation which will shorten the time spent on the road but which will not change his method of maneuvering; the cavalryman, accustomed to mounted maneuver, will consider the motor which replaces his horse as a new means of maneuvering, more vulnerable no doubt, but more rapid.

The speed of the Dragons-Portés unit, as well as its need of protection, brings this type closer to the armored-car machine gunner. His outlook, limited in the beginning to the rôle of support of mounted cavalrymen, expanded, and soon he claimed to be at least their equal as far as certain missions were concerned. Common sense justified this claim, and detachments of Dragons Portés, two battalions of 75's, one battalion of 105's, and one battalion of three squadrons of armored-car machine gunners, represented henceforth the equivalent of seven battalions of infantry supported by more than five hundred automatic weapons.

It is true that the new organization had its drawbacks, particularly increased vulnerability, due to the number of vehicles of the Dragons Portés, as well as greater dependency upon the terrain, as most of the matériel was tied to roads. The problem of supply and maintenance became therefore more complex.

The instrument became more powerful but its requirements for maintenance were also increased and it was more fragile and vulnerable.

Regulations completed and defined the methods of employment already adopted. They affirmed the necessity of exploiting the primary quality of cavalry, i.e., *mobility*. They established—almost as a principle—the use of armored cars still tied to the road but fast and powerfully armed, not only for reconnaissance detachments, but also in combat, in local offensive operations, and in delaying action at the critical time of breaking contact. They sanctioned the evolution which had already taken place and prepared that which technical development was to permit. Due to the number of its automatic arms, the cavalry division henceforth had a defensive power which it could successfully exploit when on a covering mission, or in delaying action. However, it had not yet the means of undertaking any serious offensive action on a combat front of any extent and, while it could line up seven battalions, its lack of adequate artillery prohibited it from undertaking offensive operations on a front greater than that of two battalions.

Evolution of the Cavalry from 1930 to 1933

The narrow conception of maneuver, induced by a memory of long stabilized warfare, broadened out little by little. A return to the principles of open warfare became imperative due to the very fact that the reduction of effectives does not permit of continuous fronts. The necessity of maintaining an arm capable of fulfilling the important missions which, in the past, justified the organization of the cavalry, was unquestionable; but, just how this arm should be organized, became the subject of heated discussions.

Some contended that *the development of aviation permitted the reduction or even the suppression of terrestrial reconnaissance*

formerly entrusted to the cavalry; henceforth, the airplane unaided would furnish to the commander the information he needed. Others argued that large infantry units can no longer be efficiently covered by mounted units, too vulnerable and not sufficiently mobile to maintain, in front of infantry transported in trucks, a distance required to insure its security. They do not condemn cavalry itself, but they limit its mission to the rôle of a powerful reserve of fire.

Finally, in the opinion of others, the machine dependent on terrain can in no way replace the horse which is more capable of maneuvering through woods and over fields; and only the formations based on the horse are capable of fulfilling the important missions formerly entrusted to the cavalry. Nevertheless, they recognize the necessity of reinforcing mounted units with armored elements, in order to facilitate the gaining of contact, as well as with artillery in order to develop their offensive power which was too limited.

It must be acknowledged that such views, so different from each other, contained some truth, but as it often happens, a reasoning which is basically correct may become absurd when developed if the factors liable to modify it are neglected, and similarly, an important problem risks an imperfect solution when the attention paid to the details lead to the general framework within which it is being discussed.

It is unquestionable that the airplane has become a remarkable means for securing information, but it can only do so when it "sees." But, its vision is often limited, and the negative information it furnishes is often worthless. On the other hand it is incapable of gaining or maintaining contact with the enemy. From the viewpoint of maneuver, information can only be exploited when it is of a continuous nature, which maintenance of contact alone will insure. Aerial reconnaissance may assist and reinforce land reconnaissance, but it can not replace it.

It is obvious that mounted units do not possess sufficient mobility to insure the protection of large infantry units transported in trucks. It is likewise obvious that the vulnerability of the horse does not permit the mounted cavalryman to maintain contact with a line of fire. But all the infantry is not transported in trucks and, for the infantry divisions marching on foot, the mounted formations still have sufficient

mobility. Contact with a line of fire can only be insured by combatants holding the ground. The armored car, like the mounted cavalryman, is doomed to be destroyed when immobilized under fire.

It is unquestionable that, in difficult terrain, the horse has a flexibility which the machine has not yet been able to acquire but, in many instances, the power and armor of the machine make up for such deficiency.

As a matter of fact the horse and machine constitute different means which may be substituted for each other, at times, but which more often it is well to combine. There does not exist between them any contradiction of principle, but merely a difference of characteristics. To oppose them to each other is a grave mistake entailing the risk of losing the benefits which might be derived from exploiting more fully the qualities of each through a combination of such qualities. *The machine can become for the horse an associate and a friend, and not a rival.*

Thought and common sense finally won the day in the discussions as to details which had delayed too long the solution of the problem.

The arm which in the past was organized to meet the primary needs of the command "to be informed, to retain freedom of action, to concentrate its efforts on a main point," and which can not fulfill these missions unless it has both mobility and force; this arm was designated as cavalry because the horse alone could insure both of these qualities, but this arm must now adapt itself to the necessary evolution which technical developments make possible.

The destructive power of fire had jeopardized the "punch" derived from mounted shock action; hence, cavalry must replace its lances and sabers with automatic arms in order to secure a different and new form of "punch."

The mobility which the horse insured formerly to the cavalry may perhaps be increased by mechanical means: means of transport which will lighten the burden of horses and which will bring up reinforcements without delay, either combatants or guns; armored cars which will enable the gaining of contact more rapidly and at lower costs. Cavalry must combine the horse and the machine to increase its mobility; at times it must require the latter to supplant the horse,

entirely, when the increased mobility resulting from the combination proves to be insufficient.

It is upon these considerations, resulting from thought and common sense, that the organization of cavalry in 1931 was based. This organization is characterized by:

(1) The close combination of the horse and the machine in most of the cavalry units: divisions, army corps, and divisional reconnaissance groups.

(2) The organization of a limited number of entirely motorized cavalry units: reconnaissance groups and reserve elements destined to be used for the support of large infantry units totally motorized.

The new organization is far from perfect. As a matter of fact, it is too much to expect perfection, in any organization, owing to the constant evolution brought about as a result of technical developments. However, as it is at present, it has:

(1) Increased the characteristic quality of cavalry, viz: mobility. A cavalry division with horses which no longer carry as heavy a burden, with a motorized reconnaissance group which can be pushed forward rapidly and at long distances, can, without serious difficulty, cover with its available means approximately 65 miles in 24 hours.

(2) It has increased the maneuvering ability and combat power of the cavalry.

The combination of horse and motorized elements within the framework of the Division, as well as within that of Reconnaissance Groups, enables the cavalry to adapt itself without difficulty to varying terrain and situations, while cross-country armored cars (combat cars with machine guns) eanble it to increase the effect of its offensive operations. The defect of such combination is more apparent than real. Some attach great importance to this defect and disapprove of the organization itself, stating that it lacks homogeneity.

The evolution in military organizations brought about by technical developments has long since condemned homogeneity which, if it were adhered to strictly, would require the assembly in the same formations of identical elements, each one fighting its own battle within the framework deter-

mined by its own particular possibilities. The assembly in the same formations of horse and motorized elements does not necessarily mean that they are mixed, but it does permit a combination of their action. The Commander's ability consists in combining, towards the same objective, different means of action, and the art of so doing may give greater results in proportion to the variety and power of such means.

Present Tendencies of the Cavalry. Requirements and Limits of Its Evolution for the Present

The close combination of the horse and machine, which characterizes the present organization of the cavalry, was necessary and logical as a matter of principle, but it could only be fully applied when the technical developments themselves were more complete. After having been based on the developments already achieved, the conception of the new organization required further developments before it could be fully carried out. The study of the use of new means led to the search for qualities to enhance their effectiveness. The evolution under way prepared a new evolution and a more accentuated one.

The organization of the cavalry of 1932 contemplated the use of the machine in two different ways:

(1) Non-armored cars, for the purpose of increasing its mobility and developing its aptitude for maneuvering (replacing horse-drawn trains by trucks; transport of Dragons Portés in cross-country vehicles; development of motorcycle formations).

(2) Armored cars for the purpose of securing information more rapidly.

It seemed logical to take advantage of the invulnerability and power of the armored car by extending its use to all missions which exposed the cavalryman to gain contact unprotected, and thus the necessity of two types of armored cars became apparent:

(1) A rapid, well-armed car with an extended radius of action for distant information missions; that is, the reconnaissance armored car (A.M.D: Auto-mitrailleuse Découverte).

(2) A less rapid car with a more limited radius of action, sufficiently armored to gain contact with combatants armed with rifles and destined to precede the covering elements of the cavalry—the reconnaissance armored car (A.M.R: Auto-mitrailleuse de Reconnaissance).

Common sense recommends a car capable of passing through the fire of automatic arms in order to be in a position to destroy them and to open up the way for the reconnaissance cars. Experience has shown that an armored car alone is unable to open up the way when it is obliged to stop at any point held by the enemy, and that it is incapable of maintaining contact because it is doomed to destruction as soon as it is immobilized; therefore, the necessity of a constant cooperation between the armored car and the cavalryman; or better, between the armored car and motorcyclist.

The allocation to the cavalry division of miscellaneous motorized elements (Dragons Portés, motorcyclists, scouting, reconnaissance, and combat cars) logically involved their union under the orders of a single commander and the organization of the "Motorized Brigade."

The closer combination of the horse and the machine in the Cavalry Division was not brought about by the association in the same units of horse and motorized elements, as had been thought in the beginning, but by the organization of units, some of which are mounted (horse brigades) while others are motorized (motorized brigades). Experience has shown the advantages of such an organization which insures to the cavalry, together with greater mobility, more extensive maneuvering ability, and which restores in the armored car some of its former offensive power. It has also brought to light disadvantages and risks when the desire to exploit the speed of these armored cars leads the commander to engage them in isolated combats.

The present organization represents a stage during which an evolution becomes more and more accentuated. In spite of the advantages of the combination of the horse and machine, there are some who consider that the solution is not adequate and recommend the *integral motorization of the cavalry.*

The complete motorization of the cavalry is certainly possible right now, when considered merely from the point of view of equipment. However, there are serious difficulties, namely, the cost and appropriations which would have to be voted and secondly, the risk of a procurement of cars which may become obsolete within a few years. Furthermore, before contemplating the complete motorization of the cavalry, it must be ascertained previously whether it is really justified. To be of any value at all, an organization must correspond to an end in view, and it is this very need which determines the means with which the organization should be equipped.

The use of the automobile has completely modified the movements of the infantry. It gives the armies strategical maneuvering ability, more extended as to space and more reduced as to time. However, this ability can not be exploited unless the Command has available other means with similar mobility for the securing of information, for insuring protection, and for support in battle.

In the domain of tactics it has been necessary to insure the flexibility of large infantry units which are motorized by giving them motorized reconnaissance groups; in the domain of strategy, it is equally necessary to place at the disposition of the High Command a unit capable of fulfilling the missions normally entrusted to the cavalry. This large unit, which corresponds to the cavalry division, can not have the required mobility unless it were completely motorized. It will have to be equipped with different mechanical means appropriate for the missions entrusted to it:

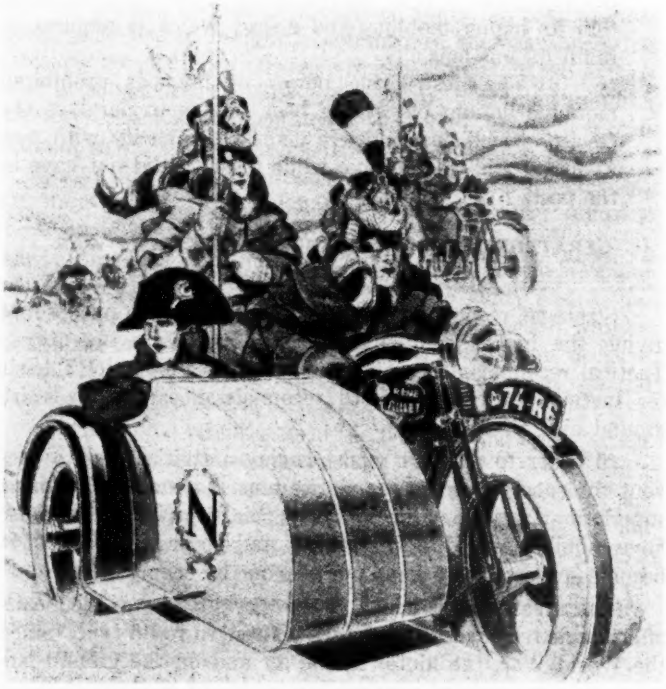
(1) Rapid armored cars and elements of support for reconnaissance and information missions.

(2) Powerful elements of fire (automatic arms and artillery) transported by unarmored vehicles, for defensive covering missions.

(3) Heavily armored cars for offensive missions and intervention in battle.

It is evident that while this complete motorization is eventually necessary it can be applied at present only to a part of the cavalry, on account of the heavy expense it would involve and the constant evolution of matériel. A large part of the cavalry will have to remain on a horse basis, as the

horse insures sufficient mobility in many cases and over certain terrain is preferable to the machine. But the mounted cavalry will have to accentuate its evolution towards mechanical means of reconnaissance which facilitate its task, and also towards mechanical means of combat which enable it to recover its offensive power.



This cartoon, taken from a foreign military periodical, shows, in a humorous manner, the role of the "New Cavalry."

At a time when the organization of the cavalry as well as its usefulness are the subject of heated discussions, the lessons of the past and actual facts and thought permit the definition of certain principles to serve as guides in the search of the evolution toward which cavalry must direct its efforts:

(1) The great missions which in the past justified the organization of the cavalry remain the same. As long

as there will be armies, the command will need to be informed, to be protected, and to be able to concentrate rapidly in the field.

(2) The means of action and the procedure for the employment of cavalry must be modified proportionally to the constant evolution brought about by technical developments, if it is desired that this arm should maintain its higher mobility and energy which it requires to fulfill its missions.

(3) The destructive power of fire has prohibited mounted action, but it has been unable to paralyze the cavalry which has gained a defensive capacity with new weapons, and an offensive value which it did not have in the past.

STRATEGIC RECONNAISSANCE IN THE NEXT WAR

By Captain F. During, Infantry

Strategic reconnaissances are made for the purpose of giving the higher command a basis for future operations. Tactical reconnaissances give the tactical commander a basis for tactical leadership. Both reconnaissances are made by ground and air forces.

In order to see and report enemy activities and to prevent the enemy from seeing us, we must have air and ground superiority; and, in order to have this superiority we must have mobility, speed, and strength, and be in a position, if it becomes necessary, to force our will on the enemy.

The cavalry corps which, in the World War, was the means of strategic reconnaissance, had the strength to do this. Since the World War, the motor in the air and on the ground has taken over the role of cavalry. It is absurd to think that we can send small reconnaissance detachments 100 kilometers into the enemy lines and expect them to come back and report. The French maneuvers of 1933 tried to replace the cavalry corps by a heavy motorized unit and, in order to give this unit tactical mobility, small mechanized units were added. Success in this case depended upon favorable road nets and uninterrupted supply of gasoline, etc. In the French maneuver

Abstracted from: Militär-Wochenblatt, 11, 18 January 1934. "Die operative Aufklärung im Zukunftskriege." By Lieut.Colonel v.Faber du Faur.

of 1932, there were attached to a mechanized brigade two horse cavalry brigades. The gait of the horse proved too slow for the mechanized brigade in order to be successful. The 1933 French maneuvers were more successful and, therefore, France decided on the use of motors alone, delegating the horse to the marching units.

We have a different situation in Italy. The terrain there does not permit the use of motorized units for combat purposes. The use of motors is confined to the transportation of troops, etc., on good strategic roads. But Italy did experiment with modern cavalry units with the understanding that, even if the experiments were successful, only a few regiments of cavalry should be modernized and kept in its army.

The situation changes again when we consider Russia and the German eastern boundary; here a motor industry which could produce large quantities of motors is absent and, to import a vast number of trucks, etc., from England and America is difficult, takes too long a time, and is too costly. Bad roads demand the very best of material. Motors are needed for airplanes and for special missions in decisive battles, but for strategic reconnaissance we must use the horse and not the motor.

The foregoing remarks form the basis for the organization of units for strategic reconnaissance.

On the German east boundary we have to consider aviation, cavalry, and mechanized units. At the beginning of the late war air reconnaissance worked independently of ground reconnaissance, the latter mission being given to the four cavalry corps. In the next war we must consider a third independent unit—the motor. Planning and cooperative action between the three units will be difficult.

Airplanes now travel from 200 to 300 kilometers, mechanized units up to 60 kilometers, and cavalry up to 10 kilometers per hour. Of course it is easy to say, let each work independently of the other. Aviation claims that it will have finished the war before the motors have reached the theater of operations, and the motor says it will be in rear of the enemy before the cavalry appears. Each one opposes attachment to the other and wants to work only under the Army. The lesson of the War, that only cooperation and teamwork of all weapons will bring a war to a successful conclusion, seems

to be forgotten. Unless we have one controlling head over the three units, we will have only confusion and chaos.

The necessity for strategic reconnaissance on a large scale is in front of the armies, and on enemy flanks after flanks have appeared. In the beginning of an operation the main effort of a strategic reconnaissance will be in front and, as soon as a flank is opened, it will change to the flank. The cavalry, having the least mobility, must be placed at a place where it is expected that a flank will be opened. Motorized and mechanized units can easily be shifted; therefore, their first mission is reconnaissance in front of the armies.

The French Army—without differentiating between strategic or tactical reconnaissance—uses corps reconnaissance detachments, which are composed of motorized units parts of which have to leave the motors in order to fight, while parts fight from the trucks, etc. These detachments screen the marching corps at a distance of from 50 to 80 kilometers, and from here dispatch smaller reconnaissance detachments.

All nations are in accord in having motorized units for reconnaissance purposes, even though cavalry is present; the only difference of opinion pertains to attachments, organization, and principles for combat. We may answer this by saying it all depends on the enemy situation, terrain, and means at our disposal.

In a situation where we have large forests, bad roads, and comparatively few modern motor vehicles, as is the case on Germany's eastern boundary, it is advisable to organize (for strategic reconnaissance purposes) small mechanized units which are capable of traversing all kinds of terrain. These small units should be under the Army, or attached to a cavalry corps. This reconnaissance detachment must be rapid in its movements. Long marches hinder the detachment in its mission. It must appear here, quickly disappear, and reappear at another place. Under no circumstances must the reconnaissance detachment be delayed by the attachment of less mobile troops.

The division is the smallest unit which has a reconnaissance detachment for tactical purposes. This detachment consists of mounted infantry and motorized units. Cavalry or motorized units must never be taken away from the army for purposes of reconnaissance for smaller units. Cavalry and

motorized units must be used at a place where the main effort is contemplated, either as the eyes or the reserve of the army, depending upon the situation.

An army reserve may consist of motorized divisions (this was the case during the French maneuvers of 1933), or of a combination of cavalry divisions (horse) and motorized divisions (non-tactical units such as were used during the French maneuvers of 1932), or of cavalry divisions (horse) with motorized divisional reconnaissance detachments.

The western front, having a fine road net, favors motorized divisions, which are capable of quickly taking and holding a desired terrain feature. On account of its long road space and the danger of aerial attacks, the division must be strong in antiaircraft weapons and, in order to combat enemy mobile ground forces, some mechanized units should be attached to the motorized divisions. France attached a mechanized brigade to a motorized division. The brigade consisted of two motorcycle troops, two armored car battalions, one regiment dragons portée, one light tank battalion, and one battalion of 75-mm. artillery. This organization was for experimental purposes only. Whether or not a motorized division with an attached mechanized brigade will be suitable for strategic reconnaissance, can only be proven under actual conditions. It seems better to have a combination as shown in the following chart:

<table>
<tr><td colspan="3">1st Cavalry Division</td><td rowspan="5">2d Cavalry Division

Same as 1st Cavalry Division</td><td colspan="3">Armored Division (Mech)</td></tr>
<tr><td>1st Brigade</td><td>2d Brigade</td><td>3d Brigade</td><td colspan="3">1st Armored Regiment (Mech)</td></tr>
<tr><td>1st Cavalry
2d Cavalry</td><td colspan="2">Same as 1st Brigade</td><td>1st Tank Bn Light</td><td>2d Tank Bn Medium</td><td>3d Armored Car Bn</td></tr>
<tr><td colspan="3">1st Horse-Artillery Regiment</td><td colspan="3">Motorized Light-Artillery Bn</td></tr>
<tr><td>1st Bn</td><td>2d Bn</td><td>3d Bn</td><td colspan="3"></td></tr>
<tr><td colspan="2">Cav Communications Bn</td><td>Cav Pioneer Troop</td><td colspan="3"></td></tr>
<tr><td colspan="7">Corps Troops</td></tr>
<tr><td colspan="3">Motorized Heavy-Artillery Regt</td><td rowspan="2">Aviation Observation Squadron</td><td colspan="3">Motorized Regiment</td></tr>
<tr><td>1st Bn Heavy Artillery</td><td>2d Bn 10 cm Cannon</td><td>3d Bn Antiaircraft</td><td>1 Bn Tanks</td><td>Armored Car Bn</td><td>1 Bn Trucks</td></tr>
</table>

PROPOSED ORGANIZATION OF A MODERN CAVALRY CORPS

The armored division can either be sent ahead, be used at a flank, or be kept in reserve. The cavalry division (horse) must have a sufficient number of armored cars to send out reconnaissance detachments if the situation calls for such action. On the eastern frontier large masses of cavalry without motorized or mechanized units, can be used to a great advantage for strategic reconnaissance. Of course, armored cars should always be an organic part of cavalry. It is very important that all reconnaissance agencies cooperate very closely. Contact between aviation and ground reconnaissance forces must be from front to rear. Information coming from the rear, and not directly from the aviation, may be too late to be of any use by the ground forces. This same principle holds true between motorized and cavalry units. Communications must be planned in great detail. The most advanced elements should be the armored cars capable of traversing any kind of terrain and equipped with 37-mm. guns and heavy, or light, machine guns. The second advanced element is the reserve for the first element and the connecting link with the main body. This second element should not be used for security measures and it must also consist of armored cars. The commander of the reconnaissance force must be given full freedom of action. At a certain distance from the enemy the strategic area changes into a tactical area in which we find motorized reconnaissance detachments of the advancing division. In this area security measures must be taken by the reconnaissance detachment of divisions. It is not easy to visualize the enormous depths of an advancing army. We have neither the time, nor the troops, nor the money to practice this maneuver in peace time. Security measures were sufficient if undertaken from 3 to 15 kilometers from the enemy, but now at least three times this distance is necessary to properly secure a command.

Reconnaissance has no limits.

REFLECTIONS ON THE COMBAT OF MODERN TANKS*

By Major C.A. Willoughby, Infantry

I—Combat of Slow Tanks

"Whatever may be the phase of the operations contemplated—initial contact or the general attack of the division—the attack for a battalion will always consist in forming a line of departure facing the objective with a suitable formation, and then moving the advanced elements on the objective." (French Infantry Regulations)

How will the enemy oppose this movement which seems so easy according to the French Regulations? By fire. Defense is the fire which stops attacks ("Instruction on the tactical employment of large units").

Where does this fire come from? *First*, from infantry elements whose essential rôle is to make use of the automatic arms distributed over a maximum depth of 800 to 1000 yards (in case of a position of resistance), firing direct or masked fire, for short ranges (0 to 400 yards) or mean intermediate ranges (400 to 1200 yards), disposed in such a manner that they will be able to furnish successive frontal or enfilading barrages and so that the majority of them participate in the dense and continuous principal barrage established immediately ahead of the most advanced elements. *Second*, from machine guns of reserve units, firing at long (1200 to 2400 yards) or maximum ranges (beyond 2400 yards) with masked, indirect, or, exceptionally, direct fire. *Third*, from the artilllery.

The fire of the *first* category is evidently the most dangerous. It is the only fire capable of stopping immediately and preventing the progression of the attack carried out by infantry. While the long range fire of machine guns may reinforce the action of the weapons nearest the enemy, they can not by themselves form impassable barrages; and the war has shown that the same applies to artillery fire. There-

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Abstracted from: Revue d'Infanterie, October 1933. "Réflexions sur le combat des chars modernes."

*This article deals with the influence of speed, in tanks in liaison with infantry. The author examines the characteristics of the tank (speed, armament, protection, vision, means of liaison, etc.) as they affect modern infantry combat. He takes the present Renault F.T. tank, a slow tank, as a point of departure and then develops the factor of speed, and its effect. The article is anonymous. There is a serious omission in the general argument: the author fails to evaluate properly the effect of efficient antitank weapons.

fore, in order that the attacking infantry may progress, it is necessary to annihilate or neutralize the fire of at least a part of the enemy automatic arms which are echeloned over an area having a maximum depth of 1000 yards and on ground which can be seen from our line of departure. In order to obtain this result we have at our disposal: infantry and artillery fire, and tanks.

Infantry fire, which is essentially the fire of light and heavy automatic arms, is very effective against unprotected personnel, but can only result in temporary neutralization for sheltered personnel. It is extremely precise and consequently requires an exact location of objectives.

Artillery fire, due to the great variety of calibers and projectiles, is effective even against sheltered personnel. It can produce, according to the quantity of ammunition employed, destruction or neutralization. Moreover, due to dispersion, it does not require a location of objectives as exact as the automatic weapons; however, when the degree of precision is lacking, the quantity of projectiles to be fired in order to obtain the destructive effects desired increases rapidly and soon reaches impracticable quantities.

Tanks, on account of their armor, are able to close in on their objectives whose location therefore does not have to be so precise as for the other arms. As a matter of fact the tanks go searching for them on the ground and, according to the expression of General Estienne, "they deliver bullets or shrapnel at the right place" (i.e., not "exposed to the vagaries of dispersion"). Tanks are, therefore, able to complete and, in certain circumstances, to replace the action of infantry and artillery fire. However, in spite of this substantial advantage, there is a serious inconvenience which is that the tank is near-sighted and, in spite of the progress realized for its vision, it will remain so for at least a long time to come and, perhaps, forever. Consequently, the search for automatic weapons is a laborious task for the tank; it may discover some of them which are doomed to certain destruction, but there are others which remain silent when it approaches and reopen fire as soon as it has disappeared. The neutralization of a zone by tanks last only so long as the tanks are actually within that zone, or in its proximity; if they leave it before the infantry occupies it, there only remain the destructive effects which

generally involve only a small portion of the enemy automatic weapons. This peculiarity explains and justifies the statement in the French Infantry Regulations regarding the employment of tanks in liaison with the infantry: "Infantry must be quick in seizing and exploiting the liberty of action, often very fleeting, given by the tanks."

Up to now we have not taken into account any characteristics peculiar to special types of tanks. Let us now examine the factor of speed in the case of the tank F.T. (Renault war-type). In combat, this tank can progress at an average speed of 1½ miles per hour, which is about the speed of advance of infantry during an attack. Inasmuch as tanks, on account of their purpose and due to their construction (difficulties of vision) can only fire effectively at short ranges (300 to 400 yards or less), they can not be expected to be able to neutralize simultaneously all the weapons of the 1000-yard zone mentioned above. In fact, in order to attack weapons which are farthest away, they must cross the entire depth of the enemy position minus 300 yards (leaving 700 yards) plus the distance comprised between our line of departure and the first enemy elements, which may be estimated at about from 400 to 600 yards, that is to say, a distance averaging 1200 yards; a run of 30 to 40 minutes. The tanks can neither precede infantry by 30 or 40 minutes since this would give to the enemy warning and give him time to put all his means of defense in action; nor can it be hoped that the tanks, which advance at about the same speed as the infantry, will gain this advance during the progression. Consequently, slow tanks can not be of much help to the infantry except against the nearest enemy weapons. It is only by advancing slowly and fighting through the enemy position that they will have an effect on weapons which are farthest away. During that time the latter will be subject to artillery and infantry fire. To sum up, slow tanks must fight abreast and can not make their action felt simultaneously over the entire depth of the enemy infantry position. This is the greatest inconvenience of the slow tank.

We know that in certain cases the French Regulations contemplate the employment of successive waves of tanks; however, this method is only contemplated when enemy weapons, against which the tanks have been unsuccessfully

engaged, stop the infantry and thus afford time to launch the additional tanks forward.

II—Combat of Fast Tanks

There is no effort so useless as that which consists in developing combat tactics for a weapon which does not exist or is not exactly defined. Let us suppose that the tank which we have in mind is a tank of the F.T. type and capable of great speed. Let us also define this speed as clearly as possible, as the problem is more complex than it at first appears.

If our tank is capable of a maximum speed over favorable and flat ground of 10 to 15 miles per hour (of which all modern tanks are capable), while the F.T. is only capable under the same conditions of a speed of 4 to 5 miles, the average speed over varied ground will be 5 to 7 miles. What then would be its combat speed, that is, the average speed at which it will progress while fighting against enemy infantry positions? Experience with the F.T. has shown that its speed can be estimated at one-fourth of the maximum speed. There are two main reasons for slowing down speed: First, the tank is near-sighted, and therefore is obliged to zigzag over the terrain in search of automatic weapons; it can only do this at relatively slow speed or else the crew would not be able to see anything; furthermore, it is obliged to stop every time that it has to carry out adjusted fire. Second, the tank while progressing through the enemy position, encounters numerous natural or artificial obstacles, and especially obstacles created by the enemy organizations, which, as it is bound by its mission to a general axis of advance, it can not ordinarily avoid by moving around. For certain obstacles the tank itself becomes a bridge and the obstacle is passed and speed is not diminished; for others, of greater width, it is necessary to shift to a lower speed, descending one side and climbing up the other with difficulty.

This last remark brings us incidentally to a more general conclusion which is too often overlooked, that is, the close interdependence which exists between the crossing facilities of a tank and its useful speed over fighting ground. For a tank whose crossing facilities are fixed, there is a point beyond which combat-speed can not be improved by increasing its speed over flat ground. In order to make ourselves clear, we

will take an example. What use would a small tank, having reduced crossing facilities, make of a speed of 60 miles per hour if every 50 yards it were to encounter an obstacle which would oblige it to slow down.

It appears that we can not expect from our fast tank a faster combat speed than 4 or 5 miles per hour. If it is desired to make use of the speed in order to reduce the number of tanks by increasing the zone of action for each tank, simplifying the "zigzags" it is obliged to make, even then the combat speed of this new weapon would not be much more than that of the F.T. tank. We may draw from this a more general conclusion that a tank, however fast, can only progress slowly at the time it is fighting effectively.

Does this mean that the increased speed of our tank would not offer any advantages in the combat area? Of course not, for a decrease in speed will occur only when the tank is actually fighting. If it is merely crossing a zone this becomes a march over varied ground, and we have seen that in this case the speed it can attain is 4 or 5 miles per hour.

The greatest disadvantage of slow tanks consists, as we have said above, in their not being able to act simultaneously over the whole depth of the enemy position. The idea suggests itself of utilizing the speed of modern tanks to offset this disadvantage. But, as we have stated, speed disappears when the tank is working effectively, therefore the only way is to engage simultaneously several echelons of tanks, some having for mission to cross rapidly advanced enemy positions in order to neutralize distant weapons (which implies a run of 8 to 10 minutes), others being launched to work immediately ahead of the infantry.

If we recall that neutralization obtained by tanks lasts only as long as they remain in the zone to be neutralized, or in its proximity, our conception is more precise, and we see immediately the advantage to be gained by assigning to each elementary tank unit, or to each section, a zone to be neutralized over which it will continue to patrol. In fact, the infantry commander would act with his tanks as he would with other fire weapons; after having studied the ground and locating likely enemy positions, he will encircle these areas with a pencil and, according to the nature, distance, or degree of localization of the objectives, he will ask his artillery or

machine-gun officer to fire over this area with shell or shrapnel at fixed times. He will also assign to tank sections the mission of neutralizing the areas thus designated.

To sum up, it would appear that the main advantage which the development of speed implies for tanks fighting in liaison with infantry, is the possibility which it offers for the tanks to act over a great area, to fight simultaneously, at a given time, over the whole depth of the enemy infantry position which is visible and dangerous for the attacking infantry. The author imagines a zone of attack in which the entire depth of the enemy infantry position is invaded by fast tanks, patrolling and searching the ground. This also facilitates the task of the artilleryman. No more rolling barrages, which are large consumers of ammunition, no more successive barrages, no preliminary concentrations adjusted with difficulty on objectives of reduced size and of uncertain locality. The task is that of simply firing on a zone while tending to the momentary neutralization of all which is situated outside the limits of the given area; meanwhile, able to intervene at the same time by means of automatic weapons and reserves.

Then the author recalls a pertinent paragraph in the *Instruction on the Tactical Use of Large Units:* "Whatever be the manner in which contact is established, the attack only takes place under good conditions if powerful material has been assembled, such as artillery, tanks, munitions, etc. The attack is therefore preceded by a period of preparation of more or less long duration, in view of assembling and exploiting this material."

The assembly of fast tanks will not result in a loss of time; particularly, if their use allows artillery to be relieved of missions requiring an enormous consumption of ammunition as well as precision fire and, instead, only require from it intermittent and rapidly adjusted fire over a definite zone. Would it be unreasonable to deduce from this a considerable reduction in the delays of preparation, which gave a dragging and jerky appearance to the operations of the last war? Will it be possible now, as it was before and as was believed in 1914, to pass without delay from contact to attack? Would one of the two main causes—difficulty of making contact, delay of preparation of the attack—which have slowed down the "rhythm" of operations, be eliminated?

THE ITALIAN MANEUVERS, 1933

By Captain F. During, Infantry

Three infantry divisions, corps troops of two corps, and one transportation group (trucks), participated in the 1933 maneuvers which took place in the Ligurian Alps and in the area: Alessandria—Bra—Mondovi—Albenga—Savona, from 22 to 26 August. It was the same area in which, in 1796, Napoleon gained his first successes over the Austrians and the Piedmontesians. Even the general situation for the maneuver was similar to that of 1796 which lead to the victories at Montenotte and Millesimo.

SKETCH NO. 1
GENERAL SITUATION

A Red Army of three corps, with the mission of destroying an enemy force reported to be in the vicinity of Alba

Abstracted from: Wissen und Wehr, December 1933. "Die italienischen Groszen Manöver 1933."

and Cherasco, had, on 21 August, reached the area as shown on Sketch No. 1. The march was to be continued on 22 August as follows:

> II Corps to march on S. Stefano and Alba
> IV Corps (assumed) to march on Cherasco
> VI Corps (assumed) to march along the coast to the vicinity of Savona, and from there, as right flank protection, on Spigno.

Orders were issued to the Blue forces to begin a march to the south on 22 August.

The II Corps consisted of the 3d Infantry Division, 4th Infantry Division (division staff only), and corps troops. The 4th Division was not available to the corps until midnight 23 August, at Albenga.

A Blue Army was concentrating in the vicinity of Bra (I Corps assumed), Alba and Nizza—Monferrato (III Corps), and northeast of Savona (V Corps assumed). The III Corps consisted of the 6th Infantry Division, 7th Infantry Division (Division staff only), and corps troops. The 7th Division was not available to the corps until midnight 23 August, at Nizza —Monferrato. The Blue forces had orders to march south, beginning on 22 August, in order to drive back enemy forces reported to be in the valleys of the Tanaro and Bormida.

The following troops were at the disposal of General Amantea, who was in charge of the maneuver: 8th Infantry Division, 1st Cavalry, Communication troops, 70 trucks, and 50 trailers.

The infantry divisions each had three regiments of infantry; one Black Shirt battalion; one horse artillery regiment of two battalions of field pieces (75-mm.); one battalion light howitzers (105-mm.); and one battalion mountain artillery (75-mm.); the necessary communication, medical, and supply detachments; one platoon of chemical troops; and one truck column for troop movements.

Each rifle platoon had three light machine guns. The corps troops consisted of one bicycle regiment with one motorized machine gun company attached (for experimental purposes), one cavalry regiment, one battalion light tanks (Carden-Lloyd type), one regiment motorized heavy artillery of four battalions (10-cm. cannon and 15-cm. howitzer), a battalion

15-cm. cannon, communication personnel, balloons, one observation squadron, and supply elements.

The 1st Cavalry was turned over to the Red forces before the beginning of the maneuver.

The terrain in the maneuver area is mountainous. From the valleys of the Bormida, Belbo, and Tanaro, which run in a north and south direction, the mountains rise to a height of 2400 to 2700 feet, and roads are very steep and have many turns. The terrain, off the roads, is only passable for infantry.

At 5:00 AM, 22 August, the Red forces began their advance with the intention of occupying the heights north of Ceva and Millesimo. In order to secure the heights, two regiments of cavalry, one bicycle regiment with the motorized machine gun company, and a battalion light field artillery (horse) were sent to the line: Prunetto—S. Benedetto Belbo, with the understanding that they would withdraw to the line: Villa—Novelli—Pedaggera—Murazzano, if superior enemy forces were met there. The 3d Division was to march to the last mentioned line, and the 4th Division, beginning at midnight 23 August, on Calizzano. Corps artillery and tanks were to march to Nucetto during the late afternoon. The 3d Division advanced in two columns; the left main column, consisting of two regiments of infantry, one Black Shirt battalion, and two battalions of field artillery, marched from Garessio on Ceva; while another column, consisting of one regiment of infantry and a battalion of mountain artillery, marched from Calizzano on Maglino.

The Blue army notified the III Corps, before the beginning of the maneuvers, that fast moving troops of the Blue V Corps would arrive on the evening of 21 August in the vicinity of the stream junction: Bormida di Millesimo and Bormida di Spigno, with the mission to advance south in the valley of the Bormida di Spigno. Based on this information and on reports received giving the exact enemy situation, the Blue Corps commander decided to secure the heights north of Ceva as rapidly as possible, using for this mission the bicycle and cavalry regiments reinforced by a battalion of infantry in trucks and a battalion of artillery (10-cm.). The 6th Division was ordered to advance by bounds to the line: Murazzano —Mombarcaro. Corps artillery (less the battalion of 10-cm. cannons) were to remain in present locations. The 7th Divi-

sion was, later, to be used in the valleys of the Belbo and Uzzone.

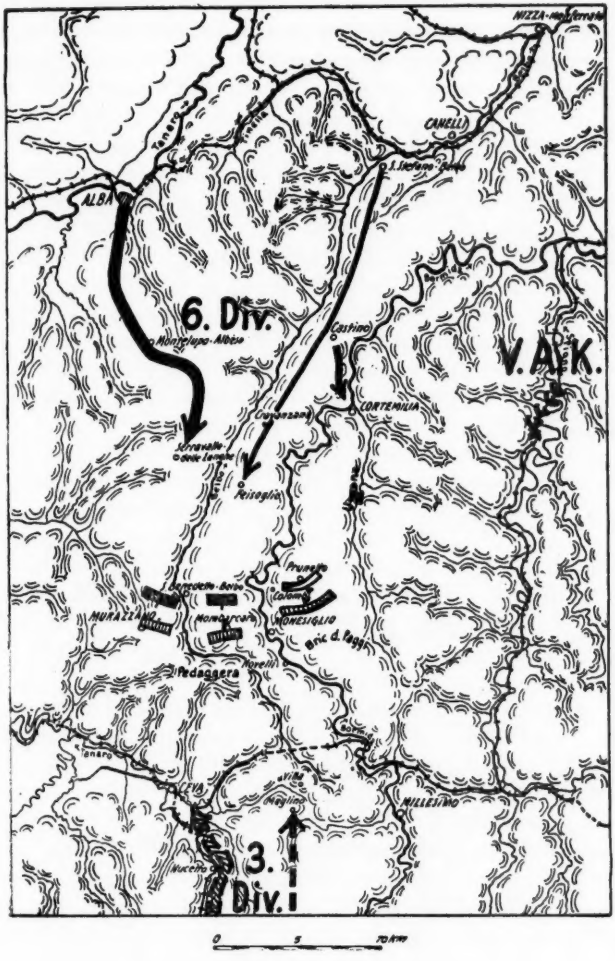
The 6th Division advanced in two columns; the right column, consisting of two regiments of infantry and three battalions of artillery, marched from Alba via Montelupo on Serravalle; the left column, consisting of one regiment of infantry and a battalion of mountain artillery, marched from S. Stefano Belbo east of the Belbo River via Feisoglio. The Black Shirt battalion, as left flank guard, marched from S. Stefano via Castino on Cortemilia. A halt was to be ordered when the general line: Serravalle—Feisoglio—Cortemilia, had been reached, and security measures were to be taken.

Red and Blue motorized machine gun companies met, at 5:50 AM, northeast of Murrazzano. Shortly after this contact was made, a Red bicycle battalion and a Blue infantry battalion in trucks arrived on the scene. The Red force lost some ground but, due to the fact that its artillery had gotten into position, was able to hold the heights of Murrazzano. On the east side of the Belbo a Red bicycle battalion and parts of the Red motorized machine gun company were driven back to Mombarcaro by a Blue bicycle battalion supported by a battalion of artillery (10-cm. cannon). A Red cavalry regiment was ordered to reinforce the Red bicycle battalion here. Another Red cavalry regiment, with a platoon motorized machine guns, occupied the heights of Colombi and Prunetto, but Blue cavalry reinforced a Blue bicycle battalion at this place during the afternoon and drove the Red cavalry back to the heights of Bric del Faggi southeast of Monesiglio.

The Red 3d Division arrived in the vicinity of Ceva at noon, and the Blue 6th Division arrived at the same time at Serravalle and Cortemilia. (See Sketch No. 2.)

The Red corps ordered the present line to be held, and an attack from that line, on 23 August, in order to gain the controlling heights north of Ceva. Corps artillery was directed to make preparations for the support of this attack.

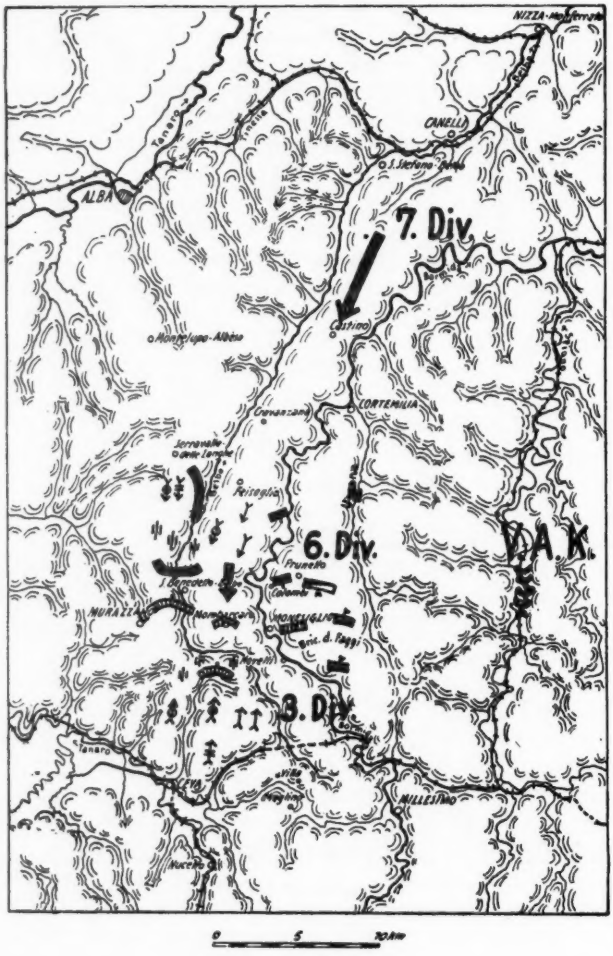
The Blue Corps ordered the corps artillery to take the valley north of Ceva under fire, on 23 August, and directed the 7th Division to advance to the heights of Castino. A Red cavalry regiment was able to regain the heights between Colombi and S. Benedetto during the late afternoon 22 August.



SKETCH NO. 2
SITUATION AT NOON, 22 AUGUST

The situation did not change to any extent on 23 August. Both sides relieved their front line troops with infantry. Red troops attacked during the early morning hours in the valley of the Bormida and drove Blue troops a little to the north.

Both sides brought corps artillery into positions and prepared for an attack on the following day. (See Sketch No. 3.)



SKETCH NO. 3
SITUATION IN THE EVENING, 23 AUGUST

During the early morning hours, on 23 August, the Red 4th Division (Staff) arrived south of Calizzano. The Blue 7th Division (Staff) reached the vicinity of Castino at noon.

The following situation existed on the evening of 23 August: The Red VI Corps (assumed) faced the Blue V Corps (assumed) which had been able to hold Savona. The Red IV Corps (assumed), after gaining some successes, had to withdraw to the high ground near Mondovi due to the successful action of the Blue I Corps (assumed). Based on this information the Blue First Army thought that a success in the enemy center would break the enemy front; therefore, the 8th Division, which had been turned over to the Blue Army, was attached to the Blue III Corps at Isola d'Asti (12 miles northeast of Alba) and the III Corps was ordered to prepare for an attack in the valley of Ceva.

The three infantry regiments and the battalion of mountain artillery, of the Blue 8th Division, was moved in two echelons from Dego to Cravanzana, a distance of about 40 miles, over difficult mountain roads. The entire movement was completed by 6:00 AM, 25 August. Field artillery and vehicles had to cover this distance by marching. With the exception of the 8th Division, a day of rest was declared for all troops on 24 August.

On 25 August the Blue forces executed local attacks only, which resulted in no change in the situation. The Blue 7th Division relieved Blue fast troops in the valley of the Bormida. The Red force moved the 4th Division to Maglino and prepared the line: Mombarcaro—Murazzano, for defense. The Red Corps intended to attack on 26 August, making the main effort on the east flank of the Blues, but, due to the situation on its left (IV Corps), began the preparation of a defensive position south of Ceva at Nucetta and in the valley of the Bormida.

The Blue Corps attacked early 26 August along the entire front. The 6th Division was unsuccessful in front of Murazzano and Mombarcaro and, at 5:00 AM, the Red forces made a counterattack. Tanks were used by both sides. The Blue corps commander decided to have the 8th Division pass through the 6th Division and renew the attack. At the same time Blue fast troops, in reserve at Cortemilia, were ordered to make a wide envelopment and attack the enemy's rear and flank. The 8th Division, after executing a passage of lines, created a gap in the enemy's line near Mombarcaro. The Red reserve was ordered to counterattack at this place, but, before they could

get into position and before the Blue envelopment materialized, the maneuver was called off.

Due to the fact that both opponents were interior corps, the maneuver had to be closely controlled, and the only tactical decisions which had to be made were those of troop leading. The maneuver was divided into phases which, according to Italian views, would be the same in case of an actual war. First day: Reconnaissance by fast moving troops and careful advance of the main body; Second day: local attacks and locating artillery position; Third day: development and preparation for an attack and the attack and the use of the reserve on the fourth day. The employment of the fast moving troops was under corps control and, depending on the terrain and road net, they were organized into units of bicyclists, or cavalry, or a combination of both, or infantry on trucks, protected by a screen of machine gunners on motorcycles occupying the heights between the valleys.

Aviation was used for observation purposes, and for one or two bombing attacks.

The troops were well trained and fulfilled all demands made upon them.

USE OF PHASE LINES

By Captain F. During, Infantry, and
First Lieutenant Frank A. Henning, Field Artillery

Today, the "Zone of Action" is one of the self-evident and indispensible tools of every commander; yet, it was originated but a few years before the World War. There was present at its birth no less a personage than General von Bulow. While in command of the III Prussian Army Corps he developed a system of battle control within his command which could hardly be surpassed for clarity and effectiveness. The "Division Training Exercises" which he originated and conducted, drew great interest and soon became the model for the entire German Army. The principles of this method of control were soon incorporated in all training regulations. The basic ideas consisted of a clearly defined line of demarcation within the battle area for each of the combat units; i.e., corresponding to our present familiar system of zones of action within the combat zone.

Abstracted from: Militär-Wochenblatt, 25 February, 4 March 1934. "Abschnittsweises Vorgehen."

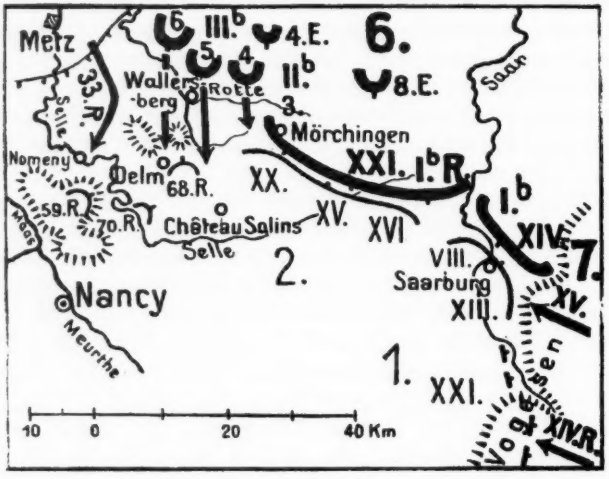
The elongated zones of action, reaching far to the rear and deep into enemy territory, are means of controlling directly the use of the modern long range and quick firing weapons which must so closely follow the infantry. It has proved itself of value and has prevented that undesirable mixing of units which was so common in the Franco-German War.

But in everything good there is some bad. Schematic and mechanical minds go astray in prescribing Zones of Action. The act of partitioning a battlefield into areas requires less exertion and less discretion than the origination of a scheme of maneuver. As a result, the skill and genius of a commander is easily replaced by the simple designation of a Zone of Action. Zones of action can only be intelligently designated when their employment is based upon a scheme of maneuver and the location of the main effort.

It takes an understanding and experienced mind to make correct decisions as to boundaries and dispositions within a sector. These qualities are even more necessary for making plans for a deep advance. Whoever remembers the adoption of zones of advance, will remember that simultaneously there came into use the practice of breaking up the advance into steps; i.e., prearranging successive objectives. The "limited objective attack" became all-important. Even though the orders stated "The division will attack the enemy," this simple, clear statement was limited and curtailed by the addition of "The line A-B will not be passed."

Such limited objective attacks were much used in the World War; but the actual results frequently were unsatisfactory. On 20 August, 1914, the German Sixth and Seventh Armies began their advance from the general area: Metz, Saarburg, and the Vosges, towards the French First and Second Armies. Crown Prince Rupert of Bavaria, to whom command of this army group had been intrusted, believed that at least an effort of double envelopment should be made. The situation seemed especially adapted for such a maneuver. During the last few days the French First and Second Armies had assembled the mass of their forces, between Saarburg and Mörchingen, in order to oppose at the west slope of the Vosges Mountains an attack of the Germans. The French flanks were weak, especially their left flank, which was exposed from Nancy to Mörchingen. The German high command

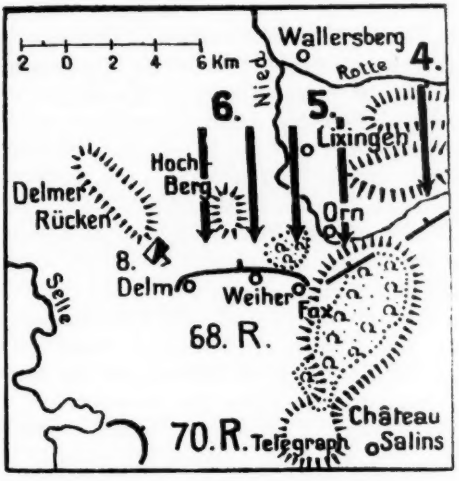
decided to have the III Bavarian Corps move quickly via Delm on Chateau Salins while the mass of the French forces were to be contained in the vicinity of Mörchingen. This Corps had been intentionally concealed in rear of the Rotte, north of the Wallersberg. The protection of the right flank of the corps was the mission of the 33d Reserve Division, which was to move forward against an enemy advance on Delm and prevent an enemy attack from the direction of Nancy.



SKETCH NO. 1
GENERAL SITUATION, 20 AUGUST, 1914

The III Bavarian Corps began the advance against the enemy at 5:00 AM, 20 August, from both sides of the Wallersberg; the 5th Bavarian Division on the left and the 6th Bavarian Division on the right. No enemy had been seen in front of this Corps for some time. During the previous evening only some weak French advance detachments had been observed in the vicinity of Lixingen. Not knowing where the French would offer any resistance, both divisions refrained from making preliminary contacts. However, the zones of advance had been clearly and definitely designated. These measures undoubtedly prevented undesirable surprise. In addition, phase lines for the advance were also prescribed.

When the units reached their first objective, which was not very distant (1 to 2 miles), they received orders to continue the advance to the next phase line. In this manner, the units—completely prepared for combat—went forward across hill and valley, and through high cornfields and wet meadow land.



SKETCH NO. 2

SITUATION OF THE III BAVARIAN CORPS 20 AUGUST, 1914

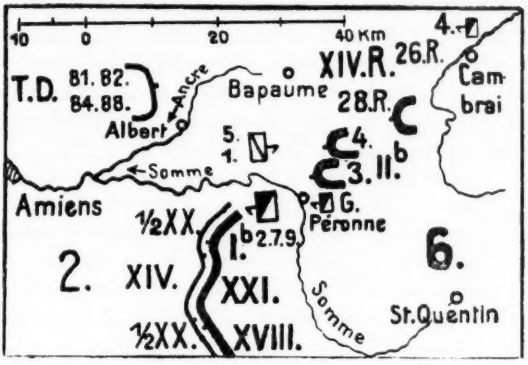
Initial contacts were made south of Lixingen and east of the Hochberg. As a matter of fact the 5th Bavarian Division and the left flank of the 6th Bavarian Division met only advanced parties of the enemy, while west of the Hochberg the 6th Bavarian Division advanced unopposed. But the piercing of this screen had consumed much time. At 10:00 AM the corps was entirely deployed, astride the Hochberg and near Orn. It had taken five hours to advance about 4½ miles. The principle of the limited objective attack had been so thoroughly instilled and was so firmly impressed upon the troops, that not even a weak enemy or no enemy at all could change this sytem. When the enemy was later met about 6 miles south of the Wallersberg on the Delm—Weiher—Fax line, prepared for defense, he was attacked along his entire line.

This attack came too late. At about 10:00 AM the commander of the French Second Army had issued instructious for a withdrawal. He had in time realized the danger to his left flank if the army should become engaged in a hard and prolonged battle southeast of Mörchingen. Only the rear guard of the French 68th Division opposed the III Bavarian Corps on the Delm—Weiher—Fax line. An unrestricted advance and pursuit in the direction of Chateau Salins might have been very successful. However, the consequences of the limited objective attack now appeared and demanded a heavy penalty. The long hours of marching across country in combat formation, and in the parching heat, had entirely exhausted the troops. In addition, the units had become mixed in spite of the definite boundaries for the advance. As a result, a halt of the Delm—Fax line within range of the enemy artillery fires was ordered, and the divisions went into bivouac for the night on the battlefield. Only two infantry regiments (19th and 21st) continued the advance, during the evening, to the heights of Telegraph Mountain northwest of Chateau Salins. The French Army, in the meantime, had pulled its head out of the noose and disappeared.

The III Bavarian Corps was opposed, on 20 September, only by the French 68th Reserve Division. The French 59th and 70th Divisions, which were in position on the Selle and on the heights northeast of Nancy, were engaged by the German 33d Reserve Division (Main Reserve from Metz) which had changed direction towards Nomeny. During the forenoon the German 8th Cavalry Division appeared northwest of Delm and, in the afternoon, the Bavarian Cavalry Division also arrived in the same area. The right flank of the III Bavarian Corps was therefore fully protected, and this corps could have thrown its full strength into the balance without restriction. Of course, the situation was not as clear then as we see it now. But who will ever have complete information in battle? A certain caution in a clouded situation is justified, but to wait until the situation is fully clarified is giving up the best opportunities for a possible victory. We can therefore understand why the III Bavarian Corps placed so much stress upon closely controlled advances.

The question arises whether or not the troops would have been more successful had they been given greater freedom

of action from the beginning of the advance. From a tactical point of view the III Bavarian Corps was successful. The advance was made in a model way, well organized and strictly controlled. Strategically it was a failure, for the envelopment of the enemy and its destruction was not accomplished.



SKETCH NO. 3
SITUATION EVENING 25 SEPTEMBER, 1914

The forward elements of the German Sixth Army (XVIII and XXI Corps and the I Bavarian Corps) advanced, on 25 September, from the area on both sides of St. Quentin and engaged two fresh French corps (XIV and XX Corps), a part of the French Second Army, half-way between Amiens and St. Quentin, which were trying an envelopment from the direction of Amiens. On the night of 25 September, the northern flanks of both forces rested on the Somme west of Peronne. The left flank of the French Army, north of the Somme, was covered only by the reinforced Cavalry Corps of Brousseau (1st Cavalry Division, 5th Cavalry Division, a detachment of perhaps half a Cavalry Division under Beaudemoulin, and the 45th Infantry Division), which was located between Peronne and Albert. West of Albert were four French Territorial Divisions which had a combat efficiency of a poorly equipped Landwehr division, and which were lacking in artillery. Opposing these forces, on the right flank of the German Sixth Army, in the vicinity of Peronne, were four German cavalry divisions (Guard, 2d, 7th, and 9th Cavalry Divisions) and two newly arrived fresh German Corps (II

Bavarian Corps and XIV Reserve Corps). In addition, the German 4th Cavalry Division had arrived at Cambrai.

The II Bavarian Corps received orders to cross the Tortille River north of Peronne at 6:00 AM, 26 September, and to advance on Bray. Its mission was to attack the enemy north of the Somme and then, from the north, to take part in a decisive battle south of the Somme. The cavalry divisions which were in the vicinity of Peronne moved in the direction of Albert, on the right flank of the corps, to drive back the French cavalry and to contain the Territorial Divisions mentioned above. The German XIV Reserve Corps received orders to assemble a strong force at Bapaume at 10:00 AM, and to move on Albert. Thus all plans had been made to overcome the enemy resistance north of the Somme and then to obtain a decision south of the Somme.

The high command of the II Bavarian Corps ordered the 3d Bavarian Division to move at 10:00 AM from the line: Moislans—Allaines, in the direction of Maurepas, while the 4th Bavarian Division received orders to advance in one column, at 6:30 AM, from Manancourt via Combles on Guillemont.

The 3d Bavarian Division (less the 22d Infantry, which was a day's march in rear; and the 23d Infantry together with the 1st Battalion of the 5th Bavarian Field Artillery, which were attached to the I Bavarian Corps) having developed east of the line: Moislans—Allaines, the night before, saw no reason for changing its advantageous dispositions. Although there was no doubt that the area west of the Tortille was held only by French cavalry, yet the troops were directed not to advance past the heights on both sides of Bouchaveness. Therefore, when this position was captured at about 8:00 AM, without much opposition, they halted. Two hours later they were again ordered to advance and, at about noon, reached the vicinity of Maurepas. Even though the French did not offer much opposition, it took six hours to cover the 5½ miles between the Tortille and Maurepas. The infantry had advanced, partly deployed and partly in approach formation, while the artillery had advanced by echelon.

The advance of the 4th Bavarian Division, less its 5th Brigade which was then about 20 miles away, was entirely different. East of Combles its advanced cavalry and artillery

quickly defeated a small French cavalry force which was attempting to delay it. West of Combles it again met resistance and was forced to deploy its advance guard. The main body had left the roads but it was in no way delayed nor did it deploy. As a result the 4th Bavarian Division took Guillemont at 9:30 AM. It had covered 7½ miles in 3 hours and that hour was about 3½ miles in advance of the 3d Division. The 4th Division, not having received further orders to advance, halted at Guillemont.

SKETCH NO. 4
ACTION DURING 26 SEPTEMBER, 1914

In the meantime the high command had been informed that the German 4th Cavalry Division, at 5:00 AM, was advancing on Bapaume from Cambrai, and that two advance guards of the German XIV Reserve Corps would arrive at Bapaume about noon. The 3d Bavarian Division was therefore directed to immediately push via Maricourt on Bray. Orders were also issued to the 4th Bavarian Division to advance via Montaub on Fricourt, but not before 11:40 AM, more than

two hours after its arrival at Guillemont. Although this division had to make all preparations for the crossing west of Bray, the order also required the division to protect the right flank of the 3d Bavarian Division, which again delayed the advance.

The opportunity had been lost. While the 3d Bavarian Division reformed into two columns to facilitate its advance, the enemy was able to bring reinforcements from the south into Maricourt, and to bring strong artillery into position. When the 3d Bavarian Division, during the afternoon, unsuccessfully attacked the town its troops were weary and exhausted. The marches of the previous days had worn them out. The limited advance, either deployed or in approach formation, during the morning of 26 September, had exhausted the troops.

The 4th Bavarian Division also came into contact with the enemy. Between 10:00 and 11:00 AM, before it had received its orders for the advance on Fricourt, enemy columns marching to the south were noticed in the vicinity of Bapaume. When it was proven that they were from the four French Territorial Divisions, the 4th Bavarian Division made a change of direction to the north in order to engage and divert the approaching enemy. At about noon the German Guard Cavalry Division arrived at Rocquigny and the German 4th Cavalry Division, with an advanced guard of the German 26th Reserve Division, arrived east of Beugny to attack the left flank of the four French Territorial Divisions. During the afternoon the German 2d Cavalry Division and the German 7th Cavalry Division, together with a part of the German 28th Reserve Division, arrived in the area between Betincourt and Baustre. At about 4:30 PM, the Commanding General of the II Bavarian Corps sent orders to the 4th Bavarian Division to break off battle and to advance on Carnoy as soon as possible, but the 4th Bavarian Division was already so completely involved that it was no longer possible to disengage.

For the race around the flanks, the high command had issued orders to the corps to attack piecemeal and to throw battalions into the line as soon as they arrived. The expediency of this method is debatable; the one justification for such an attack is when time is a determining factor. As a matter of fact, on the morning of 26 September, the way to

the French left flank was practically unopposed but the advance had to be made very rapidly.

No doubt the 3d Bavarian Division would have been severely criticized had it advanced impetuously, unrestricted, and had it attacked the enemy without being properly prepared. It advanced cautiously, using phase lines. This permitted the enemy to get up reinforcements and to prepare for a defense at Maricourt. The 4th Bavarian Division also missed a great opportunity. It should have contained the four French Territorial Divisions in the vicinity of Bapaume until the arrival of the Army Cavalry and the advanced elements of the German XIV Reserve Corps, and then advanced via Fricourt to the Somme. Such action, however, demands decision and iron nerves. The decision to do this would have been easy had the division not been given phase lines, having foreseen more distant objectives from the very beginning. When it made its attack against the Territorials it did exactly what the enemy desired. These smaller units diverted, and drew towards themselves, the danger which was threatening the left flank of the French army.

On 26 September the II Bavarian Corps acted according to what it thought best. The 4th Bavarian Division missed a wonderful opportunity. Only daring would have spelled success. He who ventures nothing gains nothing. This lesson should always be remembered.

Phase lines, of course, do not encourage such daring. They cause both commanders and troops to be cautious, and to look right and left instead of looking straight ahead. The danger grows more and more as stress is being laid upon the peace-time training of the use of phase lines. Of course, no commander can be criticized for keeping immediate control of his troops. Formerly, when he was on the battlefield himself, he saw the situation with his own eyes and acted accordingly. Then he was a leader in the truest sense of the word. Today, battles are conducted from the rear. The troops see more than the commander, he being dependent upon reports from the front. In order to control his troops he must limit their advance from objective to objective, or by phase lines.

The result will be that the tempo of attack will depend, not on those units which perhaps meeting little opposition can

move rapidly forward, but, on the cautious and slow-moving units. In this way the attack will be slowed considerably and units not meeting resistance may have to stop to await the advance of the slow-moving units. Yet an attack is only successful if the enemy line is pierced. A delay in exploitation will give the enemy time to move reinforcements to the threatened place.

Modern combat seems to make phase lines necessary. It is difficult to recognize the enemy, or where his main resistance will be, or where he is strong, or where he is weak; this will only be discovered during the course of battle. One must be constantly on the alert for attacks, ambuscades, and surprises. It will never be possible to determine exactly where the adjacent unit is or how far it has advanced. The feeling of lonesomeness and insecurity will lead to the prescription of phase lines. It now appears less desirable than ever for a commander to restrict the action of his troops. He will have much more influence upon the course of battle if he untiringly reinforces the forward units with fresh forces and additional means to nourish and strengthen their power, rather than by restricting their action.

It is not a calamity when one unit advances faster than its neighbor. The pessimist sees the accompanying risks, the disadvantages, and the dark sides of the picture. He sees himself attacked in the flank. The optimist, animated by a stronger and a firmer will, puts the advantages foremost. His higher spirits will dominate his efforts to overcome and conquer the enemy. Under similar circumstances, the pessimist will look to his own flanks while the optimist is intent upon rolling up those of the enemy. One will receive the attack from the enemy, while the other will carry the fight to the enemy. Where an opportunity to attack and win is at hand no delay is permissible. It is detrimental to morale to curtail such combats by an altogether rigid form of leadership.

Section 2

DIRECTORY OF PERIODICALS

Included in this directory are only those periodicals from which articles have been selected.

See also, Section 8, "List of Periodicals Indexed and Key to Abbreviations."

MILITARY AND NAVAL PERIODICALS

Joint Forces

General Military

Arms and Services

Air Arm

Artillery

Cavalry

Section 3

CATALOG OF SELECTED PERIODICAL ARTICLES

This section catalogs the articles selected from Library periodicals for the current quarter. Periodicals in this Catalog are arranged alphabetically.

ARMY AND NAVY JOURNAL

3 March 1934

(1) "Disruptive" Air issues hit by War Secretary
(2) Pay bill back in House; may restore longevity
(3) Air Mail bill passes
(4) General Foulois on Air Mail

10 March 1934

(5) House passes Army bill forcing 350 to retire
(6) The Field Artillery School

17 March 1934

(7) Senate drops forced retirement provision
(8) Air Mail fight arouses talk of consolidation
(9) Navy report curtails staff corps, Marines
(10) Foreign service pay

24 March 1934

(11) Pay agreement near; settle freeze status
(12) Coast defenses

31 March 1934

(13) Departments prepare to effect new pay act
(14) Tours of foreign service
(15) Army training directive
(16) Army promotion bills

7 April 1934

(17) House group rejects Rogers' report on Air
(18) Fleet will sail for East

14 April 1934

(19) Interprets new pay act
(20) Views of House group on Air policy changing
(21) Army supply bill
(22) Leavenworth Class
(23) Tighten Class "B"

21 April 1934

(24) Clause aimed at Army retirements retained
(25) Larger Army endorsed by General MacArthur

28 April 1934

(26) Disapproves Army promotion
(27) Plan Army reduction by Class B retirement
(28) Pass Generals bill
(29) Foreign service tours

5 May 1934

(30) General Pershing aids Thomson Defense Bill
(31) Army promotion bill
(32) Air transportation in war
(33) Army speeding normal retirement machinery

12 May 1934

(34) Law broken, Congress told; Air Chief replies
(35) "B" Board speeds task; final action in August
(36) Foreign service pay
(37) Army winds up air mail

ARMY AND NAVY REGISTER

3 March 1934

(1) Facts on longevity restriction
(2) Air Corps bills denounced
(3) The pay situation
(4) Field Artillery School changes

10 March 1934

(5) Morale of the army
(6) Army appropriation bill
(7) The pay situation
(8) Air Corps equipment and the mail
(9) The National Defense Act
(10) Demands younger army

17 March 1934

(11) Army appropriation bill
(12) The pay outlook
(13) Navy Department reorganization
(14) Proposed army promotion

24 March 1934

(15) The pay outlook
(16) A Naval General Staff

31 March 1934

(17) CONGRESS PARTIALLY RESTORES PAY
(18) DEPARTMENT OF AIR. Lieut.-Colonel McClellan
(19) WAR DEPARTMENT TRAINING DIRECTIVE

7 April 1934

(20) MARINE CORPS PROMOTION
(21) THE UNITED STATES ARMY
(22) EAST COAST CRUISE

14 April 1934

(23) CLASSIFICATION OF ARMY OFFICERS
(24) BOMBARDMENT OF PARIS
(25) ARMY APPROPRIATION BILL
(26) AIRPLANE PROCUREMENT

21 April 1934

(27) RANK FOR ARMY COMMANDERS
(28) NAVAL PROMOTION BILL
(29) INCREASE OF REGULAR ARMY

28 April 1934

(30) INCREASE OF REGULAR ARMY
(31) DUTY IN THE TROPICS
(32) NAVY STAFF PERSONNEL BILL
(33) ARMY APPROPRIATION BILL
(34) CAVALRY SABERS CUT OUT
(35) NEW MOTORIZATION PROGRAM

5 May 1934

(36) CLASSIFICATION OF ARMY OFFICERS
(37) MARINE CORPS PERSONNEL BILL

12 May 1934

(38) PRAISES ARMY AIR CORPS
(39) ARMY METEOROLOGICAL SERVICE

ARMY, NAVY AND AIR FORCE GAZETTE (Great Britain)

22 February 1934

(1) NATIONAL DEFENCE—ITS PURPOSE AND POLICY. Lieut.-Colonel Seton Hutchison
(2) THIS DISARMAMENT

1 March 1934

(3) ARMAMENT VALUES. Captain Altham
(4) BEHIND THE SMOKE SCREEN. Captain Liddell Hart

8 March 1934

(5) WAR IN THE CHACO. Gordon
(6) MECHANISATION AS APPLIED TO INDIA. General Heneker

15 March 1934

(7) SOVIET STRATEGIC DEVELOPMENT IN THE FAR EAST. White
(8) SEA AND AIR POWER. Vice-Admiral Harper

22 March 1934

(9) THE ARMY ESTIMATES DEBATE
(10) THE NAVY ESTIMATES DEBATE

29 March 1934

(11) THE SIZE OF BATTLESHIPS
(12) THE IMPERIAL DEFENCE DEBATE

5 April 1934

(13) THE TACTICAL EMPLOYMENT OF "MUSTARD GAS." Major Murphy
(14) EDUCATION AND WAR. Lieut.-Colonel Delahaye

12 April 1934

(15) THE COMBINED FLEET EXERCISES, 1934—I. From a correspondent
(16) STUDIES IN PROCUREMENT. Gordon
(17) ARMY INDUSTRIAL COLLEGE

19 April 1934

(18) THE COMBINED FLEET EXERCISES, 1934—II. From a correspondent
(19) THE CULT OF SLOWNESS. Major-General Rowan-Robinson

26 April 1934

(20) GERMAN AIR CHIVALRY. Harvey
(21) NATIONAL TEAM WORK IN WAR. Fayle

ARMY ORDNANCE

March-April 1934

(1) OUR FOREIGN POLICY. TO IMPERIL SECURITY IS TO INVITE CONTEMPT. Hon. William E. Borah
(2) A BIOLOGIST LOOKS AT WAR. THE CORRELATED DEVELOPMENT OF MAN AND HIS WEAPONS. Major Fox
(3) MACHINE GUN CANNON. THE DISADVANTAGES OF INCREASED CALIBERS. Major Wilhelm
(4) DISARMAMENT AND DEFENSE. Sir Charles Petrie
(5) ENGINES FOR FIGHTING TANKS. Captain Rarey
(6) PROOF TESTS AND PROOF MARKS. (III) Lieut.-Colonel Goddard

ARMY QUARTERLY (Great Britain)

April 1934

(1) A CRISIS OF THE CAMPAIGN IN FRANCE IN 1914. Major-General Bird

(2) MILITARY OPERATIONS: FRANCE AND BELGIUM, 1914.
(3) THE OTHER SIDE OF THE HILL. No. XI. IN FRONT OF BEAUMONT-HAMEL: 13TH OF NOVEMBER, 1916.
(4) LOOKING AHEAD. Captain Grant
(5) UMPIRING WITH TANKS. Major-General Collins
(6) THE SIEGE WARFARE OF THE ANCIENTS. Lieut.-Commander Ascherson
(7) INFANTRY REORGANIZATION: A REPLY. By "East Saxon"
(8) POLYBIUS AS A MILITARY WRITER. Keith-Falconer
(9) THE WINTER MARCH OF A BRIGADE OF GUARDS THROUGH NEW BRUNSWICK, JANUARY, 1862. Lieut.-Colonel Pearkes
(10) FROM MAXIM TO VICKERS: SOME REMINISCENCES OF AN INFANTRY MACHINE-GUN OFFICER. Major Wade
(11) THE PREPARATION OF THE PRUSSIAN ARMY FOR THE WAR OF LIBERATION, 1813.
(12) FOUR MEN ON THE RIDGE. ECHOES OF A FORGOTTEN CONTROVERSY. III. RICHARD BAIRD SMITH. Lieut.-Colonel Thackeray

BULLETIN BELGE DES SCIENCES MILITAIRES (Belgium)

BY CAPTAIN F. DURING, INFANTRY

November 1933

(1) PAGES D'HISTOIRE DE L'ARMÉE BELGE AU COURS LA GUERRE 1914-1918: RAID DU 1ER CARABINIERS DEVANT NIEUPORT LE 29 JUIN 1918. [History of the Belgian Army during the World War 1914-1918. Raid in the vicinity of Nieuport on 29 June 1918 by the 1st Carabiniers.] Captain Yernaux

(2) MANOEUVRE DE DÉFENSE PASSIVE DU PAYS DE LIÉGE. [Passive aerial defense at Liége.]

The Belgian authorities organized, in the town of Liege, defensive maneuvers against an imaginary aerial attack. Most elaborate preparations were made. The actual maneuver took place on 6 and 7 July. The inhabitants of Liege cooperated with the government in making this maneuver a success. Trials were also made with an incendiary bomb known as the "Electron."

(3) LE FRANCHISSEMENT DES COURS D'EAU. [River crossings.] (VI) Lieutenant Thonnard

In this final article on river crossings Lieutenant Thonnard gives the four stages of river crossings: (a) Detailed reconnaissance and secret bringing up of troops, guns, ammunition, and material. (b) Crossing of front line units (personnel and matériel) by means of rafts and light foot bridges. (c) Construction of bridges. (d) Construction of heavy bridges for heavy army vehicles.

(4) VAUBAN AU SIÉGE DE CHARLEROI (1693). [Vauban and the siege of Charleroi (1693).] Major Delvaux

(5) L'OBSERVATION DE L'ARTILLERIE DE D. I. EN DÉFENSIVE SUR UN FRONT ÉTENDU. [Divisional artillery observation on a defensive front.] Colonel Baesens

December 1933

(6) PAGES D'HISTOIRE DE L'ARMÉE BELGE AU COURS DE LA GUERRE 1914-1918.—LES CONTRE-ATTAQUES AU 'BOYAU DE LA MORT' EN MAI ET SEPTEMBRE 1915 PAR LE 9E DE LIGNE. [History of the Belgian Army during the World War 1914-1918. The counterattacks at the "Boyan de la Mort," south of Nieuport in May and September 1915.] Lieut.-Colonel Jones

A personal experience of some desperate fighting for the possession of a trench on a bank of the Yser.

(7) LA FORMATION DES OBSERVATEURS EN AVION. [Flying formations of observation planes.] Major Courtois

(8) LE COMBAT DE ROSSIGNOL—BELLEFONTAINE (22 AOÛT 1914). [The battle of Rossignol—Bellefontaine, 22 August 1914.] Major Desoil

The author gives a detailed account of the battle of Rossignol—Bellefontaine. He gives as reasons for the French failure: their indifferent staff work and defective intelligence system.

(9) A PROPOSITO DI TIRO DI FUCILIERIA CONTRO GLI AEREI A BASSA QUOTA. [Observations on rifle fire at low-flying airplanes.] Lieut.-Colonel Mecozzi. ("Rivista Militare Italiana," October 1933)

The "Rivista Militare Italiana" for February, March, and April 1933 published, under the above title, a study by Lieut.-Colonel Garrone, Infantry. Lieut.-Colonel Mecozzi, of the Italian Air Corp,s

analyzed the study of Colonel Garrone and arrived at the following conclusions, which differed somewhat from the ones arrived at by Colonel Garrone.

Colonel Mecozzi assumes a battalion of infantry at full strength, with its transportation, marching on a straight road, with units maintaining distances between each other in anticipation of an air attack. He also assumes that the length of this battalion is 1,000 yards and that it has 550 rifles and 24 automatic rifles.

A flight of three low-flying airplanes launches an attack at this target at a speed of about 150 miles an hour, or about 66 yards a second.

Each plane has the following armament: (a) two machine guns (the latest Italian attack planes have three) having a rate of fire of 900 shots per minute or 15 shots per second; and (b) a bomb thrower (Spezzonatrice) which is capable of throwing a large number of small bombs, similar in weight and power to the Bertone or Benaglia bombs, at a varying rate of speed. The plane is capable of carrying 600 bombs, the total weight, including the bomb thrower, being about 700 pounds.

We can assume that the bomb thrower can throw from one to thirty-three bombs per second, or one bomb every two yards to one bomb every sixty-seven yards. The effective radius of action of these bombs is about one hundred yards.

When the three planes appear, units scatter over the terrain adjacent to the road; the most fortunate soldiers will be able to reach a distance of about 35 yards.

Assuming that the planes, seeing that their target remains partly on the road (especially the trains) and partly dispersed, fly at a convenient distance from each other, permitting them to cover 1200 yards of the road.

The first plane flies along the road; the second plane flies on a line parallel to and 20 yards to the right of the road (assuming the road is 8 yards wide); and the third plane flies at a similar line on the left.

As the radius of action of each bomb is fifty yards, we obtain three superimposed bands, totalling a width of 140 yards. Each plane, during the 1200 yards or eighteen seconds of flight, will fire 540 shots from the machine guns and throw 600 bombs having 24,000 fragments, or a total of 24,540 projectiles.

The central band (100 yards) will receive more than double the fragments (63,804 projectiles) and the two lateral bands of 20 yards will receive 9,816 projectiles, which will reach those who are the greatest distance from the road (35 or even 50 yards).

Calculating the space occupied by each man in the zone covered with projectiles, Lieut.-Colonel Mecozzi arrived at the conclusion that each man will have slightly more than 160 chances in 1,000 of being hit. The battalion will therefore lose 16% of its effectives, or 92 men.

The author next examines the action of the battalion. At the alarm signal nearly all the soldiers scatter over the terrain adjacent to the road and take the most favorable position for firing. For various reasons some of the 574 rifles will probably not be in a condition to fire. Others will undoubtedly be reached by aerial projectiles before having opened fire, or after having just commenced to fire. The author assumes a total of 25 rifles will be rendered ineffective this way. He further assumes that the antiaircraft action of the riflemen lasts eighteen seconds and that during this period the riflemen are able to fire four rounds and the auto riflemen eighteen rounds.

We have 525 rifles times 4 rounds equal 2,100 rounds, and 24 automatic rifles times 18 rounds equal 430 rounds; therefore, 549 men will have fired 2,530 rounds. The three airplanes move at a speed of 67 yards per second for eighteen seconds in a space of three dimensions, 50 yards wide, 1200 yards long, and 50 yards high, or 3,000,000 cubic yards in which are distributed the 2,530 bullets with a mean of one bullet for 1,170 cubic yards. In each of the three planes, the motor, the pilot, and the tank representing a maximum of 2 cubic yards would prevent the continuation of the flight if they were hit. Conse-

quently, each plane has 17 chances in 10,000 of being hit.

CANADIAN DEFENCE QUARTERLY (Canada)

April 1934

(1) PACIFIC SPECULATIONS. (Editorial)
(2) THE TSITSIHAR OPERATION. Nikolaieff
(3) MIGHT HAVE BEEN—OR AS YOU WERE. MR. LLOYD GEORGE ON BRITISH GENERALSHIP. Captain Heighington
(4) SELF TRAINING. Lieut.-Colonel Alexander
(5) THE MILITARY ASPECTS OF THE PEACE TREATIES, DISARMAMENT AND SANCTIONS. Major Murison
(6) THE BOYCOTT IN INTERNATIONAL LAW. Brown
(7) COLONEL SIR EDOUARD PERCY GIROUARD. A MEMOIR. Major-General Pritchard
(8) DISCIPLINE. Flight Lieutenant Heakes
(9) THE ORGANIZATION OF NATIONAL DEFENCE IN THE FRENCH REGIME. Captain Thomas
(10) FRANCE: ARMY REORGANIZATION

CAVALRY JOURNAL

March-April 1934

(1) REDUCTION AND READJUSTMENT OF PACKS ON CAVALRY HORSES. Lieut.-Colonel Scott
(2) POST-DEPRESSION PERSONNEL. First Lieutenant Rawlins
(3) NEW MAP-READING DEVICE. Second Lieutenant Hamilton
(4) WAR IN THE CHACO
(5) THE SPANISH CAVALRY SCHOOL. First Lieutenant Tausch
(6) MARSHAL MURAT. Dickinson
(7) THOMAS LAFAYETTE ROSSER. Major Hanson
(8) WATER
(9) AN AMERICAN CAVALRY MARCH—100 MILES IN 24 HOURS. Captain de Labouchere
(10) THE AIR CORPS AND NATIONAL DEFENSE. Honorable George H. Dern, Secretary of War
(11) INFANTRY IN BATTLE . . . SIMPLICITY
(12) IMPROVISED MOBILE MACHINE GUN NESTS
(13) POLICIES. Colonel Johnson
(14) STATEMENT OF MAJ.GEN. GUY V. HENRY, CHIEF OF CAVALRY, IN HEARINGS BEFORE THE SUBCOMMITTEE OF HOUSE COMMITTEE ON APPROPRIATIONS ON THE WAR DEPARTMENT APPROPRIATION BILL FOR THE FISCAL YEAR 1935
(15) THE FORT RILEY MANEUVERS
(16) RESERVE OFFICERS. THEIR ASSIGNMENT AND TRAINING FOR STAFF DUTY. Lieut.-Colonel Sutphen

CAVALRY JOURNAL (Great Britain)

April 1934

(1) THE CAVALRY IN FRANCE, AUGUST-NOVEMBER, 1918. Part I. Lieut.-Colonel Preston
(2) LAKE AND VICTORY (MONSON'S RETREAT). Colonel Maunsell
(3) A SPY STORY. Major Robertson
(4) MECHANIZED FORCES. Major Patton, Jr.
(5) MODERN CAVALRY HEAD-DRESSES. Lieut.-Colonel Ryan
(6) CAVALRY IN THE GREAT WAR: BATTLE OF THE MARNE. Part III. Lieut.-Colonel Martin
(7) SWORD TRAINING. Captain Wheeler
(8) PRINCIPLES FOR THE EMPLOYMENT AND COMMAND OF INDEPENDENT CAVALRY FORMATIONS. Count Schack (Retired Colonel)

CAVALRY SCHOOL MAILING LIST

15 March 1934

(1) ADMINISTRATION OF FORAGE RATION. Lieut.-Colonel Scott
(2) THE NEW DEMANDS ON WEAPONS. ORDNANCE PROGRESS TOWARD SPEED AND FLEXIBILITY. Colonel Wesson
(3) NEW "MILE A SECOND" BULLETS COME TO THE AID OF THE FOOT SOLDIER
(4) THE CAVALRY LIGHT MACHINE GUN. Captain Heavey
(5) POLICY FOR MECHANIZATION AND MOTORIZATION UNDER THE PUBLIC WORKS MOTORIZATION PROGRAM
(6) BRITISH ARMY MECHANIZATION PLANS ALTERED
(7) POLICIES AFFECTING THE OFFICERS' RESERVE CORPS
(8) THE FOUR ARMY PLAN
(9) DIVISIONAL CAVALRY. Major Balck, German Army
(10) ARMY TRAINING, 1933. Major-General Collins
(11) TACTICAL DOCTRINES AND TRAINING METHODS—SOVIET RUSSIA
(12) "I CELERI" ("Light troops")
(13) INTERNATIONAL ARMAMENT AND DISARMAMENT. Colonel Blech
(14) WATER

COAST ARTILLERY JOURNAL

March-April 1934

(1) THE ROLE OF DEFENSIVE PURSUIT. PART III. PURSUIT OPERATIONS IN THE FORT KNOX EXERCISES. Captain Chennault

(2) MINIATURE SERVICE FIRING. Colonel Cloke

(3) THE AIR CORPS AND NATIONAL DEFENSE. Honorable George H. Dern

(4) POLICIES. Colonel Johnson

(5) CAPITALIZING LEISURE IN THE C.C.C. Captain Wertz

(6) A RAILROAD ARTILLERY PROBLEM. Captain Lewis

(7) CARE OF .50 CALIBER MACHINE GUNS. Captain Waldron

(8) MILITARY HISTORY: A DEFINITION. Lieut.-Colonel Arthur

(9) IMPROVISED MOBILE MACHINE GUN NESTS

(10) CAN WE BROADEN OUR BASIC EDUCATION? Lieutenant Gill

(11) HOW THE TROPHY WAS WON. THE 249TH C.A. (HD) SETS NEW RECORD FOR GENERAL EXCELLENCE. Captain Farnsworth

(12) RIGID TOWING DEVICE FOR MOTOR TRUCKS. Captain Whittaker

(13) EXCALIBER LONG RANGE PRACTICE AND EX-EX-CALIBER PRACTICES. Major Lutes

(14) NEW TYPE TESTING FOR GUNNERS' EXAMINATIONS AS USED IN THE 243RD COAST ARTILLERY (HD). Captain Parker and Lieutenant Dunnelly

ESERCITO E NAZIONE (Italy)

BY CAPTAIN F. DURING, INFANTRY

October 1933

(1) ALLA CONFERENZA GENERALE DEL DISARMO—SPESE MILITARI E ARMAMENTI. [The disarmament conference. The question of cost.] Valentini

In June 1933 the League of Nations contemplated the limitation and control of expenditures for military armaments for all members. On account of the strong opposition by Italy, Japan, and Germany, this plan failed. The author gives the following reasons why Italy opposed such a plan:

(a) If the military budget is limited, it is possible that more money will be spent for military armaments, etc., camouflaged under a different budget.

(b) There can be no fixed boundary between military expenses for peace and expenses for preparation for a potential war.

(c) Military expenses are mostly for armaments; therefore armaments should be cut down and the military expenses would become less.

(d) In case the contemplated plan had passed, every nation would spend to the limit of the authorized budget, thereby preventing a gradual decrease of expenditures.

(e) Nations which are fully prepared and armed would remain so under the plan; therefore, the limitation of expenses would aid such nations.

(f) No nation will submit for a long time of having its expenses controlled by the League of Nations.

(2) POLITICA E AZIONE MILITARE NELLA RICONQUISTA FASCISTA DELLE COLONIE. [Political and military action regaining the Italian colonies for the Fascists.] Piccioli

(3) NEL MONDO SENZA PACE—IL CONFLITTO TRA COLOMBIA E PERU. [A world without peace. The conflict between Colombia and Peru.] Micaletti

A resumé of the reason for the conduct of the conflict.

(4) IL CANE DE GUERRA. [The dog in war.] Olivieri

November 1933

(5) L'AERO-COOPERAZIONE IN GUERRA. [Cooperation with aviation in war.] Prepositi

Reference is made in this article to the new British regulation: "The employment of aviation by the army," which is considered as the best and most up-to-date regulation for military aviators. According to this regulation each division has an observation squadron organically assigned, while observation for artillery is assigned to the corps. The strength of an observation squadron has been changed from 16 to 12 planes. In order to obtain air superiority, heavy bombers and a very large number of pursuit planes are used. Attack is considered as the best defense; in fact, offensive spirit is stressed throughout. Observation planes for strategic reconnaissance missions are equipped with radio, while the observation planes for

tactical reconnaissance are equipped with radio telephones.

(6) AUTOTRASPORTO DI UN BATTAGLIONE. [Transportation of a battalion by trucks.] Borgnini

This article gives the action and orders of a battalion, reinforced by one platoon armored cars and one battery of artillery, which has received orders to move by motor in front of a marching division, in order to protect other motorized troops. The entire battalion, including animals and vehicles, are loaded on trucks and moved in the following order:

Reconnaissance detachment: one armored car and one platoon infantry.

Advanced point: three armored cars, one platoon heavy machine gun company, and one platoon infantry.

The advance guard, consisting of one company of infantry (less one platoon), followed after a distance of 1000 yards. The distance between the advance guard and the main body was 2½ miles. The main body was divided into four echelons with 300 yards between echelons. One platoon of infantry acted as rear guard.

December 1933

(7) LA ORGANIZZAZIONE DELLE NAZIONI PER LA GUERRA—V. LA JUGOSLAVIA. [The organization of nations for war: Yugoslavia.] Franchini

(8) ALLA CONFERENZA GENERALE DEL DISARMO—NOTE SU LA LIMITAZIONE DELLE SPESE MILITARI. [The disarmament conference. The control of military budgets.] Valentini

(9) TRUPPE DEL GENIO NELL'INSEGUIMENTO. [Engineers in pursuit.] Biagioli

The author discusses the duties of engineers as part of a motorized unit at a river crossing during a pursuit.

(10) UN MARESCIALLO DI SAVOIA—BERNARDO OTTONE DI REHBINDER (1662-1743). [Bernard Otto von Rehbinder, Marshal of Savoy (1662-1743).] di San Secondo

FIELD ARTILLERY JOURNAL

March-April 1934

(1) MAJOR GENERAL HARRY G. BISHOP RETIRES AS CHIEF OF FIELD ARTILLERY

(2) THREE BATTLES IN ONE. Colonel Lanza

(3) FORT SILL SCENE OF HISTORIC PARLEY

(4) THE MURDEROUS POWER OF THE ARTILLERY. General Culmann, French Army

(5) WHY USE AIMING POINTS FOR RAPID PREPARATION OF FIRE? Captain Park

(6) PAVIA—THE RECONNAISSANCE MASTERPIECE. Pratt

(7) A RAPID METHOD OF COMPUTING K. Lieutenant Montague

(8) A PROFESSOR OF ARTILLERY TACTICS. Jones

FIGHTING FORCES (Great Britain)

April 1934

(1) THE FOUNDATIONS OF EUROPEAN ORDER. Major-General Fuller

(2) THE AFFAIR OF THE 21ST AND 24TH DIVISIONS AT LOOS, 26 SEPTEMBER, 1915. Captain Wynne

(3) NAPOLEON AS A TACTICIAN. Symons

(4) EUROPE—FROM AN ARMCHAIR. Carter

(5) THE TRIANGULAR DUEL IN THE FAR EAST. Brigadier-General Bruce

INFANTRY JOURNAL

March-April 1934

(1) THROUGH THE PANAMA JUNGLES. Captain McCarthy

(2) ARMY—INFANTRY—AIR CORPS. Honorable George H. Dern, Secretary of War

(3) INFANTRY IN BATTLE—SIMPLICITY

(4) THE INFANTRY DIVISION. Lieut.-Colonel Scammell

(5) CONSCIENCES AND WARS. Lieut.-Colonel Finch

(6) IMPROVISED MOBILE MACHINE GUN NESTS

(7) ANTIAIRCRAFT INSTRUCTION FOR RIFLE UNITS. Captain Hyde

JOURNAL OF THE ROYAL ARTILLERY (Great Britain)

April 1934

(1) SECTION OBSERVATION APPLIED TO MOVING TARGETS AT SEA. Lieut.-Colonel Burrowes

(2) A VISIT TO INDIA AS COLONEL COMMANDANT. Lieut.-Colonel MacMunn

(3) BLINDMAN'S-BUFF IN THE CHACO. Larden

(4) EXTRACTS FROM "THE CONDUCT OF WAR." IV.—THE SURPRISE ON

THE NIED. Marshal Foch (Translated by Captain Kernan)
(5) HUNTING AS A TRAINING FOR WAR. A LECTURE DELIVERED AT CORK ON NOVEMBER 12TH 1908. Major Powell
(6) MILITARY COLLEGE OF SCIENCE. Brigadier Benson

JOURNAL OF THE ROYAL UNITED SERVICE INSTITUTION (Great Britain)

February 1934

(1) TEACHING IN THE ARMY. Major-General McCulloch
(2) THE EXAMINATION COMPLEX. Major Pemberton
(3) IMPERIAL DEFENCE: THE ARMAMENT MOSAIC. By "Tessera"
(4) NIGHT ATTACKS BY AIR. By "Syphax"
(5) THE UNCONQUERABLE MIND. By "B. Buckley"
(6) FRANCE AND BELGIUM, 1914: The REVISED OFFICIAL HISTORY. Captain Garnons-Williams
(7) THE CHACO WAR. Larden
(8) THE INTERNATIONAL SITUATION

JOURNAL OF THE UNITED SERVICE INSTITUTION OF INDIA (Great Britain—India)

January 1934

(1) "WITH THE TENDENCY OF MODERN MILITARY ORGANISATION TOWARDS MECHANISATION, THE INCREASING COMPLEXITY OF MODERN WEAPONS AND THE DEPENDENCY OF TROOPS ON THEIR MAINTENANCE SERVICES, IT IS ASSERTED BY MANY THAT REGULAR TROOPS ARE LOSING THE DEGREE OF MOBILITY NECESSARY FOR THE SUCCESSFUL PERFORMANCE OF THEIR ROLE ON THE NORTH-WEST FRONTIER." (Essay, 1933—by "Borderer")
(2) BACTERIAL WARFARE. Major Fox
(3) WHAT EVERY YOUNG OFFICER WANTS TO KNOW. By "Mouse"
(4) COMMUNAL DISTURBANCES IN WALLED CITIES. Lieut.-Colonel Burrows
(5) THE RECRUITMENT AND INITIAL TRAINING OF RATINGS FOR INDIA'S NAVAL SERVICE. By "R.I.M."
(6) THE PERIMETER WALL. Lieut.-Colonel Pearson

MARINE CORPS GAZETTE

February 1934

(1) BASES MEAN SHIPS. Captain Knox
(2) LEGISLATION. PERSONNEL SITUATION
(3) MODIFICATION OF OUR SMALL ARMS COURSES. Marine Gunner Henderson
(4) FOREIGN AFFAIRS. Healy
(5) BATTALION ORGANIZATION FOR OUR RESERVE. Jacobs
(6) THE FLEET MARINE FORCE. Lieut.-Colonel Keyser

MILITARWISSENSCHAFTLICHE MITTEILUNGEN (Austria)

BY CAPTAIN F. DURING, INFANTRY

November 1933

(1) ZUM KAPITEL "DURCHBRUCH." EIN RÜCKBLICK. [The breakthrough. A retrospect.] General v.Horsetzky

Lieut.-Colonel Kiszling's article, "The Strategic Breakthrough," in the February 1933 number of the Militärwissenschaftliche Mitteilungen, (see abstract in RML No. 50, page 24), is the reason for this retrospect. General v.Horsetzky claims the breakthrough, a creation of Napoleon, as that rapid movement towards one part of an enemy force which placed Napoleon on interior lines and thus enabled him to overwhelm it, while evading and holding off the remainder of the enemy, to be disposed of later.

The strategic breakthroughs of Napoleon consisted therefore, of several operations or, as the case might be, of operations of deception, of defense, or of pursuit, separated from one another by time and space. It was this method of conducting war, of which he was a masterly exponent, that was typical of Napoleon. At times Napoleon employed the tactical breakthrough, notably at Austerlitz, with the greatest success, and at Aspern, where it failed.

The author gives the following definitions: Tactical breakthrough has as its object the piercing of all lines of the enemy's first position. Operative breakthrough includes the foregoing and also the following up or pursuit of the enemy. Strategic breakthrough is the crumbling of the whole enemy front and the smashing to pieces of its parts.

(2) CADORNA—CAPELLO. DIE ITALIENISCHE FÜHRUNG VOR DER SCHLACHT BEI KARFREIT. [Cadorna and Capello. Italian leadership

before the Battle of Caporetto.] Major Heydendorff

The author examines the decisions arrived at by the Italian commanders in the autumn of 1917, in order to throw light upon the fact that the capture of the Bainsizza plateau and the great victory of the Italians in the eleventh battle of the Isonzo, were followed hardly two months later, by their crushing defeat at Caporetto.

Major Heydendorff finds that the Italian GHQ had every intention of continuing its offensive, and the necessary movement of troops and ammunition to that end were in full progress, when on 18 September General Capello, the commander of the Second Army, suddenly and to his surprise, received orders from the Commander-in-Chief, to stop all offensive preparations and to go on the defensive. This order, which allowed the initiative to pass into the hands of the enemy, and which, contrary to all expectations, provided the enemy with the necessary breathing space for the preparation of his offensive, was the real reason for the catastrophe of Caporetto. General Capello, who desired to continue the offensive, received this order with mixed feelings and by pleading the unsuitability of his present position for a defense at all costs, prevailed upon the Commander-in-Chief to allow the Second Army to prepare for an active defense. Even this permission was withdrawn on 20 October, but it was then too late to make any adequate arrangements before the storm broke and caught not less than fifty batteries on their way to the Tolmein sector, where the Austrians had remained in possession of the bridgehead.

(3) VERKEHRSWEGE UND IHRE EMPFINDLICHKEIT GEGEN LUFTANGRIFFE. [Line of communications and their susceptibility to attacks from the air.] Major Ringel

The network of communications which a country possesses, and the carrying capacity of that network, are the foundations of that country's national economy. From this we may also gauge the country's military power and the rapidity of its blow. The air warfare of the future, having its targets far behind the frontiers of enemy nations, creates entirely new conditions for making estimates. Factors which together formerly contributed to determine the separate values of railroads, roads, and waterways, have now a new disturbing factor of unknown strength added, viz., the extent to which each one of them is liable to be affected by air attacks. The solution to the problem how to avoid traffic disturbances, caused by attacks from the air, is to provide carriages and trucks capable of running either on rails or on the road.

The author points out the comparative invulnerability to air attack of the lines of railways themselves, since short portions which are destroyed, can be repaired comparatively quickly. The same applies to roads. On the other hand, railroad junctions, railroad bridges, electric works, and road bridges, etc., are very vulnerable to attacks from the air and should be camouflaged or, whenever possible, constructed underground.

(4) INTENDANZDIENST IM GEBIRGSKRIEGE. [Supply and transportation in mountain warfare.] General Glingenbrunner, Retired

This article gives an account of how a battalion in position on the Marmolata—queen of the Dolomites—was supplied during 3½ years of warfare. Engineers had to build roads, paths, and accommodations in addition to erecting and maintaining funiculars. The chief difficulty, apart from enemy action, arose from a winter lasting nine months and providing avalanches at any time between November and April. These avalanches cost far more lives than shell fire and point to an avalanche proof construction as a first necessity.

(5) IM SCHEITELPUNKT DES GROSZEN KRIEGES. [At the zenith of the war.] Major General Kerchnawe

A review of Parts One and Two of the Austrian Official Military History, based on notes and memories of General Kerchnawe

December 1933

(6) NOCHMALS: DIE ENTSTEHUNG DER TIROLER WIDERSTANDSLINIE. [The

evolution of the Tyrol line of defense.] Major Ellison-Nidlef

The author takes exception to the views expressed in Colonel von Eichthal's articles of the same title in the May and June 1933 numbers of the "Militärwissenschaftliche Mitteilungen." Colonel v.Eichthal showed how the continuous line of defense along the whole Tyrolese mountain frontier came to be adopted instead of reliance being placed upon the existing system of defensive works placed so as to defend the main lines of approach, while the interval between one group of works and the next was either regarded as impassable or its defense was left to mobile troops. The author disagrees with the statement that the interval between one group of works and the next was regarded as impassable by saying that "no officer who served in the Tyrol in the last few years before the War was in any doubt of the passability of the intervals between forts." His historical retrospect shows that the fortification of the Tyrol took place in four periods: from 1835 to 1861; the fortress of Trient 1880 to 1884; a third period from 1884 to 1900, and the latest period from 1909 to the War. He points out that the works according to significance, position, and strength, fulfilled their purpose and were the iron skeleton of the four years' successful defense of the Tyrolese defense.

(7) KAVALLERIESCHRECK. [The moral effect of cavalry.] Major General Kerchnawe

The author cites examples from history of the moral effect of cavalry upon infantry, apart from shock effect. In one instance a panic was caused in a Serbian battalion at the sight of large clouds of dust raised by an Austrian battery, which, finding itself too much exposed, limbered up and started to change position by galloping across the fields, and the "fatal" sound of "cavalry" passed by the bugles from company to company.

(8) DIE MANÖVER IM JAHRE 1933. [The maneuvers in 1933.] Major General Schäfer

In Italy only one division operated against another (later two), but to each side was added a cavalry brigade, a cyclist brigade, a motorcycle company, and tanks. The main object was tactical leadership.

French maneuvers were of the nature of tactical and technical trials, motorized troops being used. Secrecy was maintained by a cordon of police around the maneuver country.

The Russian maneuvers, which were to have been held near the Polish frontier, were called off.

Poland held its maneuvers, but published no details.

The British Royal Air Force held a large maneuver in the southern part of England. 162 bombers operated against the antiaircraft defenses and 152 of the latest airplanes. Combined naval and air maneuvers took place in September on the Scottish coast.

French naval maneuvers were on a specially large scale.

Japanese air and naval maneuvers took place on a very large scale and lasted over a long period.

(9) ERNTEVERWERTUNG IN SERBIEN 1916-1918. [The utilization of the harvest in Serbia, 1916-1918.] Steinitz

(10) UBER DIE BEFEHLGEBUNG BEI GEBIRGSMÄRSCHEN. [Calculations of time and space in mountain marches.] Colonel Hubicki

MILITAR-WOCHENBLATT (Germany)

BY CAPTAIN F. DURING, INFANTRY

11 December 1933

(1) VERMEHRTE RÜSTUNGEN IN ALLER WELT. [Increased armaments in the world.]

(2) MILIZEN. [Militia.] (II) Colonel v.Loebell

In this second series the author cites three examples of the use of militia in war: American Civil War, 1861-1865; The War of 1870-71; The Boer War of 1899. The conclusions drawn are interesting. The use of militia resulted in cessation of fighting in Virginia for about one year. This would have been impossible in an European theater of war. The American Civil War has taught a lesson which should never be forgotten, viz., the need of a standing army, sufficiently

large to act as training cadre for the armies to be formed, and the training of a sufficient number of officers of all grades. In speaking of the Boer War, the author concludes that bravery, heroism, and patriotism are a valuable asset, but they will never display training and immediate complete obedience of orders, so essential in war.

(3) SCHNELLE TRUPPEN UND BEWEGUNGSKRIEG IN ITALIENISCHER AUFFASSUNG. [Motorization and mobile warfare according to Italian views.]

The author asks that the people become more interested in military affairs and cease their present indifference. Stabilized warfare is very costly in lives, and places enormous demands on industries, which alone should be sufficient reasons to go back to the war of movement. This would have the great advantage that the element of surprise would again be possible, especially by the use of motorized troops. The most important mission of motorized troops would be to prevent stabilized warfare. The last Italian maneuvers have shown us not only that this can be done, but also how it should be done. The author answers the question: Horse or motor? by changing the "or" to "and." In conclusion the author advocates the close cooperation between ground troops and aviation; surprise can only be attained, if we have this close cooperation.

(4) GEDANKEN ZUR WEITERENTWICKLUNG DER S. MG.-WAFFE. [Future developments of the heavy machine gun.]

(5) FLUGZEUGE ALS TRUPPENTRANSPORTMITTEL. [Airplane as a means for troop transport.]

(6) GESCHICHTE DER KÖNIGLICH PREUSZISCHEN ARMEE. [History of the Prussian Army.] Lieut.-General v.Altrock

(7) TAKTISCHE AUFGABE 3. [Tactical Map Problem No. 3.] Solution of first requirement. Second Requirement: Orders as actually issued by the commander of the 19th Infantry.

18 December 1933

(8) DER SOLDAT ALS VORKÄMPFER DES NATIONALSOZIALISMUS. [Soldiers versus National socialism.]

(9) MILIZEN. [Militia.] (III) Colonel v.Loebell

(10) JAGDFLIEGERAUSBILDUNG IM AUSLAND. [Training of aviators in foreign countries for pursuit missions.] Lieut. Feuchter, Retired

(11) WERTLOSE KLEINTANKS. [Are small tanks ineffective?]

(12) WEHRMACHTVERHÄLTNISSE IN NATIONALITÄTENSTAATEN. [The situation of national defense in allied states.]

(13) TAKTISCHE AUFGABE 3. [Tactical Map Problem No. 3.] Solution to 2d Requirement.

25 December 1933

(14) RÜCKBLICK AUF 1933. [In retrospect, 1933.]

(15) DIE NEBELSCHLACHT BEI AMIENS AM 8. AUGUST 1918. [The black day for Germany, 8 August, 1918.] General v.Kuhl

A discussion of the book by the same name.

(16) BEWEGUNGSKRIEG UND STELLUNGSKRIEG. [Mobile war and stabilized war.] Major Buhle, Retired

The author asks the question: "Will it be possible to obtain a quick decision at the beginning of the next war? While all nations hope so, we have no assurance that such will be the case. It will be impossible for the best of leaders to follow a preconceived plan. A recipe for victory has not been found, but we have good and bad plans of operations. We will find in the next war offensive spirit and bravery as well as self-control and coolness. The first makes for movement, the second for defensive action, and the latter is important as all nations claim that they would only go to war in defense of their homelands. The individual soldier prefers to go ahead, but the higher leaders must necessarily control the operations in order to secure freedom of action. We have four powerful factors which work against the war of movement: (1) Weight, (2) Fatigue, (3) Hunger, and (4) Self-preservation. The last three are psychological. The first is weight or "matériel," from the machine guns to the large tanks and 50-cm. mortars. It takes gas and oil and some more gas and oil to move heavy material. The next war will show how mobile "matériel" really is. The only true

mobile war will be fought in the air, where "matériel" does not hinder movement. The greater the radius of action of aviation, the more independent becomes the mobile war of the air from the action of the ground forces. The mobile war of old was a knightly and chivalrous war, but stabilized warfare has changed all that. In the war of movement the enemy was killed, wounded, or taken prisoner; in the stabilized war he was buried alive, burned, gassed, starved, and choked to death. Each nation, having an army which is capable of operations, desires a war of movement, unless forced to a war of stabilization, but it will be difficult to continue a war of movement during the entire war, unless one side is able to obtain a decision soon after the beginning of the war.

(17) ITALIEN—RUSZLAND. [Italy—Russia.] Captain Braun

(18) GEFECHTSFORMEN DER RUSSISCHEN KAVALLERIE. [Battle formation of the Russian cavalry.]

(19) DIE LAFETTIERUNG DER 20 MM-BREDA-MASCHINENKANONE. [The mounting of the 20-mm. Breda automatic cannon.] Däniker

(20) DIE LETZTEN MILITÄRISCHEN OPERATIONEN IN MAROKKO UND LIBYEN. [The last military operations in Morocco and Libya.]

(21) EIN ITALIENISCH-DEUTSCHER BOMBENANGRIFF AUF FRANKREICH. [An Italian-German bombing attack in France.]

General Armengaud has stated that the combined aviation of Germany and Italy could carry (on the first day of the war) between 2,000 and 2,500 tons of bombs to a distance of 250 km. into France. The author disproves this fantastic statement.

4 January 1934

(22) NEUJAHRSGEDANKEN EINES SOLDATEN. [New Year's thoughts of a soldier.]

(23) DIE ARTILLERIE IN HINHALTENDEN KAMPF. [The artillery in prolonged battle.] (I) Captain Gallwitz

In this article the author disagrees with the practice of having the mass of the artillery in rear of the main effort, because "the main effort of the artillery is not where the artillery is massed, but at the place where the shells are effective." The disadvantages of massing the artillery in rear of the main effort is that in rear of the secondary effort we usually find too little artillery. This enables the enemy in his counter measures to attack the flank of the secondary effort, with the great possibility of turning that flank and gaining a decision.

(24) INFANTERIE IM ANGRIFF. FRANZÖSISCHE UND ENGLISCHE STIMMEN. [Infantry in the attack. French and English views.] (I)

(25) KRIEGSERFAHRUNGEN MIT KAVALLERIE FRÜHERER PRÄGUNG. [War experiences with the "old" cavalry.]

Criticisms of cavalry leaders of the use of cavalry in the late war.

(26) DIE NORDWESTLICHE MANDSCHUREI ALS OPERATIONSGEBIET. [Northwestern Manchuria as an area of military operations.] Plaetschke

A discussion of the military geography of Manchuria.

(27) LUFTFAHRT-RUNDSCHAU. [Review of aviation developments.] Lieutenant Feuchter, Retired

(28) IRREGULÄRE FORMATIONEN DES HEUTIGEN JUGOSLAWIEN. [Irregular formations of the present Yugoslavia.]

(29) DAS ITALIENISCHE OFFIZIERKORPS. [The Italian corps of officers.]

(30) BAKTERIENKRIEG. [Hygiene.]

(31) SIND DIE TAGE DES UBOOTES GEZÄHLT? [Are the days of the U-boats counted?] Captain v. Waldeyer-Hartz

11 January 1934

(32) DIE OPERATIVE AUFKLÄRUNG IM ZUKUNFTSKRIEGE. [Strategic reconnaissance in the next war.] (I) Lieut.-Colonel v.Faber du Faur. (See abstract, page 24)

(33) DIE ARTILLERIE IM HINHALTENDEN KAMPF. [The artillery in prolonged battle.] (II) Captain Gallwitz

The author emphasizes that flexibility is more important than mass, and flexibility will deceive the enemy as to the correct strength of the artillery. Flexibility is obtained by placing the artillery in such a manner that a strong effective artillery fire can be placed at any desired part of the front.

(34) INFANTERIE IM ANGRIFF. FRANSÖSISCHE UND ENGLISCHE STIMMEN.

[Infantry in the attack. French and English views.] (II)

(35) ERDGEBUNDENE FLIEGERABWEHR UND IHRE WIRKUNG. [Antiaircraft positions.]

The author states in this short article that the mission of antiaircraft is not to shoot down enemy aircraft but to keep this aircraft at a very high altitude. Antiaircraft, while an important factor in the defense system, will never prevent an aerial attack.

(36) DAS FARBIGENPROBLEM IN FRANKREICH. [The color (race) problem in France.]

(37) DIE OSTSEE IM ZEICHEN DER NICHTANGRIFFSPAKTE. [The Baltic Sea in view of the non-offensive treaties.]

(38) MOTORISIERUNG UND MECHANISIERUNG DER ARMEE DER VEREINIGTEN-STAATEN. [Motorization and mechanization in the United States.]

18 January 1934

(39) FRANZÖSISCHE GEDANKEN ÜBER NEUZEITLICHE VERWENDUNG VON LUFTSTREITKRÄFTEN. [French thoughts on modern employment of military aviation.]

The French thoughts can be grouped into four conclusions: (1) Aviation alone will never bring about a decision. (2) Employment of aviation for purely political reasons may be advisable at times. Generally speaking, however, an independent employment of aviation on a large scale will not be advantageous at the beginning of war, as the loss of ships and men will be too great considering the results obtained; it would also be detrimental for the operations of the ground forces. (3) Employment of aviation on a large scale in conjunction with the operations of ground forces is sure of success. Aviation should not be split into many small units. (4) Greatest development of pursuit aviation in order to prevent aerial attacks by the enemy and to obtain and maintain air superiority at that place where the decision is being sought by the ground forces.

(40) DIE OPERATIVE AUFKLÄRUNG IM ZUKUNFTSKRIEGE. [The strategic reconnaissance in the next war.] (II) Lieut.-Colonel v.Faber du Faur. (See abstract, page 24)

(41) EIN TANK ALS STÜTZPUNKT. [A tank as a strong point.]

(42) ENGLAND UND DER NAHE OSTEN. [England and the Near East.]

The author raises the question whether the building of an English railroad through South Perisa to India would effect the Suez Canal trade and whether England could afford to give up the Suez Canal after the railroad Haifa—Karachi is in use. He answers the latter in the negative on account of the connection with the East African coast and England's colonies in the Far East. The railroad would adversely affect the canal trade which already suffers through commercial aviation and automobiles, etc.

(43) BLEIBENDE LEHREN FÜR ERZIEHUNG UND AUSBILDUNG. [Lessons for instruction and training.]

(44) DIE FRANZÖSISCHE JUGENDAUSBILDUNG. [The French training of youth.]

(45) DIE ELEKTRIFIZIERUNG DER ITALIENISCHEN EISENBAHNEN. [Electrifying Italian railroads.]

25 January 1934

(46) WEHRPOLITISCHE UBERSICHT. TSCHECHOSLOWAKEI. [Survey of national defense: Czechoslovakia.]

(47) DIE MAROKKANISCHE DIVISION IN DER MARNESCHLACHT. [The Moroccan Division in the Battle of the Marne.]

A discussion of the book, "La division du Maroc aux Marais de St. Gond," by Colonel Hurault de Ligny.

(48) GEWEHRGRANATEN IM BEGEGNUNGSGEFECHT. [Rifle grenades in a moving battle.]

(49) KRIEGSERFAHRUNGEN MIT KAVALLERIE FRÜHERER PRÄGUNG. [War experiences with the old cavalry.] Colonel Schack and Captain Beutler

An answer to the criticism of the old cavalry ("Militär-Wochenblatt" No. 25, 4 January 1934). Colonel Schack recommends that the following points be incorporated into the new cavalry regulations: (1) The main mission of the cavalry is not distant reconnaissance, but entrance in battle at the decisive front in order to attack the enemy in flank and rear. (2) In order to be able to do this, cavalry must always be at full strength; therefore, such missions as distant reconnaissance,

screening, security, etc., should not be given to the cavalry. (3) Cavalry should be used against motorized units. (4) Missions given to the cavalry must be consistent with the strength, armament, etc., of this arm. This latter was violated many times during the war.

(50) DIE NEUBEWAFFNUNG DER SCHWEIZER ARTILLERIE. [The new armament of the Swiss artillery.]

(51) VON DER WIRKUNG ERDGEBUNDENER FLIEGERABWEHR. [Antiaircraft positions.] Captain Pickert

A reply to the article of the same name ("Militär-Wochenblatt" No. 26, 11 January 1934) in which the author states that antiaircraft is very effective in that it keeps an aviator dodging shells, etc., thereby distracting the aviator from his mission.

(52) DAS RUSSISCHE FLUGWESEN. [Russian aviation.]

The observation, attack, and light bombing planes of the Russian Air Force are constructed partly or fully of metal. Pursuit planes are one or two-seaters with Turbo-compression motors. The heavy bombers have a cruising radius up to 1200 km., carrying one ton of bombs. A few planes are under construction having four and five motors. The personnel of the Air Corps is well trained. The only weakness of the Russian aviation is the motor. Russian workmen lack the training and practice in building a type of motor which equals that of other nations.

4 February 1934

(53) GENERALOBERST FRHR. V.HAMMERSTEIN-EQUORD. [General v.Hammerstein-Equord.]

(54) WEHRMACHT UND NATIONALSOZIALISMUS. [Army and national socialism.]

(55) DAS FRANZÖSISCHE INFANTERIEREGIMENT. [The French infantry regiment.]

The organization and armament of a French regiment of infantry.

(56) DIE PANZERDIVISION IM KAVALLERIEKORPS-VERBAND. [The armored unit in the cavalry corps.] Colonel Schack

This study is based on the article, "The Strategic Reconnaissance in the Next War," by Lieut.-Colonel v.Faber du Faur. (See "Militär-Wochenblatt" Nos. 26-27, 11, 18 January 1934; also abstract, page 24.) Colonel Schack questions the ability of armored cars being able to leave roads and believes that they have no place in a cavalry corps in a war in the east. Colonel v.Faber du Faur in a footnote replies that armored cars can leave the roads. He also states that a cavalry corps without armored cars meeting one with armored cars is nothing but mounted infantry. He concludes with the statement that in the future motors will be with us even in the snow and mire of the east.

(57) LAWINENGEFAHR IM HOCHGEBIRGE, IHRE ERKENNUNG UND VERMEIDUNG. [Snow slides in high mountains, how to know and how to avoid them.]

(58) DAS VERKEHRSPROBLEM IN DER SOWJETUNION. [The traffic problem in Russia.]

(59) DIE ABRÜSTUNGSKOMÖDIE. [The disarmament comedy.]

11 February 1934

(60) IST DER CANNÄ-GEDANKE NOCH ZEITGEMÄSZ? [Can we still have a "Cannae"?] Lieut.-General Fleck, Retired. (See abstract, page 5.)

(61) VERBESSERUNGEN AN KAMPFWAGEN. [Improvement in tanks.]

(62) LUFTFAHRT-RUNDSCHAU. [Survey of military aviation.] Lieut. Feuchter, Retired

(63) ZU "KRIEGSERFAHRUNGEN MIT KAVALLERIE FRÜHERER PRÄGUNG." [War experience with the "old" cavalry.] General v.Poseck

General von Poseck replies to an article of the same name, which was published in the "Militär-Wochenblatt" No. 25, 4 January 1934. General v.Poseck agrees that the old cavalry was not properly equipped nor armed and that the employment of the army cavalry was very often faulty, which was largely due to the fact that the combat efficiency of cavalry was overrated.

(64) DAS 5. INTERNATIONALE REIT- UND SPRINGTURNIER BERLIN 1934. [The fifth International Horse Show, 1934, in Berlin.]

(65) EIN MILITÄRBÜNDNIS FRANKREICH/BELGIEN—HOLLAND? [Is there a three-power alliance: France, Belgium, and Holland?]

18 February 1934

(66) ZUSAMMENSETZUNG SCHNELL BEWEGLICHER VERBÄNDE. [Composition of fast moving units.] (I) Lieut.-Colonel v.Faber du Faur

This article is based on the lessons learned from the actions of the cavalry on the Western Front in 1914. In this series the author gives a resumé of the action of the German cavalry during the first months of the war.

(67) WAFFENTRAGENDE UND POLITISCHE SOLDATEN IN IHREM VERHÄLTNIS UNTEREINANDER UND ZUR JUGEND. [Active and "political" soldiers and their relation toward each other and toward the youth of Germany.]

(68) DIE ITALIENISCHE WEHRMACHT 1934/35. [Survey of the Italian military and naval situation, 1934-35.]

(69) FLUGZEUGKANONEN. [Cannon for airplanes.] Lieut. Feuchter, Retired

The author states that the disadvantage of the recoil has been solved by the construction of the "Vickers-Armstrong" and the "Hispano-Suiza." The specifications and characteristics of the latter are being kept secret by the French, but tests with the "Vickers-Armstrong" were witnessed by the author, who states that no vibration was noticeable when the gun was fired in flight or on the ground.

(70) EINSATZ CHEMISCHER KAMPFSTOFFE IN DER VERTEIDIGUNG UNTER BESONDERER BERÜCKSICHTIGUNG "CHEMISCHER SPERREN." [The use of chemical war material in the defense, with special reference to "chemical obstacles."] Major Kleeberg, Retired

The author advocates the gassing of entire areas instead of tactical points such as bridges, road crossings, etc. In order to do this other arms than artillery are needed to gas the area. Armored cars equipped with mustard gas tanks should gas avenues of approach; railroad gas tank cars, drawn by a locomotive, should gas rails and terrain from 30 to 50 yards on both sides of the road bed. Special airplanes with mustard gas tanks attached should spray selected areas from a height of 20 to 30 yards, and bombing planes should bomb selected areas with bombs filled with mustard gas. Men should be equipped with an apparatus similar to that of the flame throwers to gas houses, cellars, etc., and finally gas mines should be placed in areas of 500 square yards; the mines to be set off by a time fuze or some other mechanical device.

"Gas obstacles" are very effective in a passive defense; in an active defense, however, space must be reserved for maneuver, if it is decided to use gas at all. Gassed areas are especially effective in a withdrawal. Armored cars should also be used to place gas on enemy lines of communications.

(71) UNRUHE IN AUSTRALIEN UND SÜDOSTASIEN. [Unrest in Australia and Southeast Asia.]

(72) DIE STARRE DER PARADEMÄRSCHE. [Parades and reviews.]

(73) GESUNDHEITSBERICHT ÜBER DAS REICHSHEER. [Health report of the German Army.] Major Adams, Retired

(74) SOLDAT ODER TECHNIKER? [Soldier or technician?] Tenax

(75) ZUSAMMENSETZUNG SCHNELL BEWEGLICHER VERBÄNDE. [Composition of fast moving units.] (II) Lieut.-Colonel v.Faber du Faur

The author continues the resumé of the action of cavalry on the Western Front in 1914. In his summary he states that the cavalry was not as effective as could have been expected, and gives as reason for this, that the German high command wasted the strength of the cavalry by useless marches and whenever an opportunity presented itself for the cavalry to gain some glory, it had no strength left to take advantage of this opportunity. The cavalry had lost heart and after the war turned over its role to the motor, instead of making the motor subordinate to its own role.

Another reason why the cavalry was not effective was because it was defective in fire power. Machine guns and howitzers were issued too late. Today cavalry is nothing but mounted infantry, unless it has armored cars organically assigned to it. Strategic reconnaissance is the mission of the cavalry corps; distant tactical reconnaissance, the mission of the cavalry brigades with

the armies and close tactical and battle reconnaissance the mission of the mounted detachments of infantry regiments.

(76) ABSCHNITTSWEISES VORGEHEN. [Use of phase lines.] (I) Major Deuringer, Retired (See abstract, page 42.)

(77) LUFTKRIEG ZUR SEE. [War in the air at sea.]

(78) DIE DEUTSCHEN HEERES-SCHIMEISTERSCHAFTEN IN BERCHTESGADEN. [The German ski masters at Berchtesgaden.]

(79) DER POLNISCHE HEERESTATE. [The Polish budget for defense.]

4 March 1934

(80) FRANKREICHS ANTWORT: KEINE ABRÜSTUNG! [The reply of France: No disarmament.]

(81) WELCHE FORDERUNGEN STELLT DER MATERIALKRIEG? [Modern war requirement.] Captain Crisolli

A reply to an article by General Debeney, published in "Revue d'Infanterie," May 1933 (see RML No. 51, pages 148 to 150). The author disagrees with General Debeney that it is material and men which will win the next war. He states that the World War proved that a nation inferior in material can still win large battles. In the big German drive on 21 March 1918, Germany had less material than the Allies; still, they swept everything before them. The author states that a nation which has superior leadership and high morale is very likely to win a war over an enemy superior in material alone. The author concludes with the statement, that only the next war will prove whether or not General Debeney is correct in all of his views. It is unquestionable that material will play an important role in the war, but in the final analysis it is the morale of the men and the superior leadership which will master material.

(82) ABSCHNITTSWEISES VORGEHEN. [Use of phase lines.] (II) Major Deuringer, Retired. (See abstract, page 42.)

(83) NOCH EINMAL: "KRIEGSERFAHRUNGEN MIT KAVALLERIE FRÜHERER PRÄGUNG." [War experiences with the "old" cavalry.] Lieut.-Colonel Hansen

A reply to the article of the same name, "Militär-Wochenblatt," 4 January 1934.

(84) DER BALKAN, WIE ER HEUTE IST. I. JUGOSLAWIEN. [The Balkans of today. I. Yugoslavia.]

(85) ENTWICKLUNG NEUER METHODEN BEIM LUFTBOMBENANGRIFF. [Development of new methods for bombing attacks.] Lieutenant Feuchter, Retired

Based on "diving bombing attacks"—a method used by the United States Navy. This method of bombing has found great approval in England.

MILITARY ENGINEER

March-April 1934

(1) INDUSTRIAL MOBILIZATION. Captain Burdick

(2) PRESSURES ON RETAINING WALLS. Major Besson

(3) THE GREAT SMOKY MOUNTAINS NATIONAL PARK. Campbell

(4) BEAU SABREUR. Major General Bishop

(5) THE ARMY WAR COLLEGE. Major Saunders

(6) AN INGENIOUS ENGINEERING FAILURE. Pratt

(7) L'AERO SYSTEM OF SURVEYING AND MAPPING. Maxwell

(8) GROPING FOR PEACE. (Editorial)

(9) ORGANIZATION AND OPERATION OF THE WATERWAYS EXPERIMENT STATION. Lieutenant Vogel

(10) GEODETIC ENGINEERING APPLIED TO THE COLORADO RIVER AQUEDUCT. Hough

(11) GENERAL GRANT IN PANAMA. Kirkpatrick

(12) TRANSPORTATION. Colonel Capples

May-June 1934

(13) THE CAPE COD CANAL. Lieut.-Colonel Park

(14) INVASION—FACT OR FICTION? First Lieutenant Reinhardt

(15) HISTORIC FRENCH CREEK. Major Ransom

(16) THE SITUATION IN EUROPE—A BRITISH VIEW. Major Reynolds, Royal Artillery, Retired

(17) RECLAMATION WORKS OF EASTERN MACEDONIA. Lieut.-Colonel Gausmann

(18) STRATEGIC MINERAL SUPPLIES—1. GENERAL SURVEY. Major Roush

(19) A SUBMARINE VOYAGE IN 1900. Cable

(20) COOLING THE CONCRETE IN BOULDER DAM. Vivian
(21) TRANSPORTATION. Colonel Caples
(22) HOW'S THE CANAL DOING? Kirkpatrick
(23) ANTIMONY SUPPLY IN WAR. Henderson
(24) DIPLOMACY AND INLAND NAVAL WARFARE. Lieut.-Commander Dohrman
(25) PRACTICAL HINTS ON FOUNDATION PROBLEMS. Bouillon
(26) ENGINEER BOARD NOTES
(27) PEACE AND PACIFISM. (Editorial)

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(1) THE EVOLUTION OF THE PUBLIC HEALTH SERVICE. Surgeon General Cumming
(2) THE DAYS GONE BY: A CAVALRY DETACHMENT THREE AND A HALF DAYS WITHOUT WATER. Captain King

NAVAL INSTITUTE PROCEEDINGS

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(1) AMERICA'S AËRONAUTICAL PIONEERS. Lieutenant Mazet
(2) NATIONAL DEFENSE, 1934. Commander Brandt
(3) JOINT MILITARY-NAVAL OPERATIONS: A SPECIALTY. Commander Broadbent
(4) CONFLICTING SIGNALS—A CRITICAL ANALYSIS. Lieutenant Farwell
(5) OUR FIRST BATTLESHIP. Lieut.-Commander Gosnell
(6) LIGHTER-THAN-AIR CRAFT AND LINE SQUALLS. Lieutenant Nelson
(7) THE NAVAL AVIATOR IN RESERVE. Colonel Reisinger

April 1934

(8) THE FOUNDATION OF NAVAL POLICY. (Prize essay, 1934) Lieutenant Holmes
(9) A METHOD OF SEARCH FOR THE "AKRON." Lieutenant Richardson
(10) PHILIPPINE INDEPENDENCE FROM THE ECONOMIC STANDPOINT. Lieut.-Commander Vickery
(11) PREFACE TO THE FREEDOM OF THE SEAS. Captain Cummings
(12) TELEGRAPHY'S FIRST ASIATIC CRUISE. Lieutenant Gibbs
(13) STANDARDIZING THE U.S. NAVAL ELECTRIC DETONATOR. Munroe
(14) MAPPING THE OCEAN FLOOR. Captain Rude
(15) THE HISTORY OF AËROLOGY IN THE NAVY. Lieutenant Nelson

May 1934

(16) NAVAL PREPAREDNESS IN THE PACIFIC AREA. (Honorable Mention, 1934) Rear Admiral Stirling
(17) EFFECT OF MECHANIZATION AND MOTORIZATION ON TACTICS. First Lieutenant Harris
(18) PLAYING SAFE WITH BOOKS. Captain McIntosh
(19) NAVAL ACADEMY PRACTICE SHIPS. Magruder
(20) UNRULY RULES OF THE ROAD. Lieut.-Commander Welch and Lieutenant Perry
(21) TRAINING THE RESERVE SUPPLY CORPS. Lieutenant Lennox
(22) NEW USES FOR MARTELLI'S TABLES. Boatswain Hopkins
(23) SELECTION OF "STRIKERS." Lieutenant McEathron
(24) VALUE OF AIRSHIPS. Lieutenant Commander Wiley
(25) THE 1933 LINDBERGH FLIGHT. Lieutenant Commander Weems
(26) ANOMALOUS TIMES OF FLIGHT IN SALVO FIRE. Captain Schuyler

QUARTERMASTER REVIEW

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(1) THE ENCHANTED FOREST. AN ACCOUNT OF THE CIVILIAN CONSERVATION CORPS. Major Porter
(2) OLD FORT SNELLING. Major Grant
(3) COASTAL CIVILIZATIONS OF ANCIENT PERU. Major Sawders
(4) THE NEW CONSTRUCTION CONTRACT. Lieutenant Jones
(5) YOU AND I IN UTILITIES. Lieutenant Hastings
(6) REVOLUTIONARY ANIMAL MISMANAGEMENT. Lieutenant Gill
(7) THE QUARTERMASTER PROBLEM

REVISTA DEL EJERCITO Y DE LA MARINA (Mexico)

BY FIRST LIEUTENANT M.D. TAYLOR, F.A.

November 1933

(1) PROBLEMAS DE LA REVOLUCIÓN MEXICANA. [Problems of the Mexican Revolution.] General Rodriguez
(2) EL EJÉRCITO Y LA REVOLUCIÓN. [The Army and the Revolution.] General Quiroga
(3) LA REVOLUCIÓN Y LA EDUCACIÓN MILITAR EN MÉXICO. [The Revolution and Mexican military education.] General Amaro

(4) La Revolución Mexicana. [The Mexican Revolution.] Massip

(5) La Revolución y el ideal politico social. [The Revolution and the social-political ideal.] Ortega

(6) Organización de los Servicios en el Ejército. [Organization of the services of the Army.] Lieut.-Colonel Alamillo Flores

(7) La Etica en los Ejércitos Modernos. [Modern military ethics.] Lera

(8) Una Guerra Preventiva? [A preventive war?] A translation from "Time," of 30 October 1933.

(9) La Instrucción Quimica de las tropas en el Ejército Rojo. [Chemical instruction in the Soviet Army.] Major Moreno. (Extract of an article appearing in the German publication, the "Militär-Wochenblatt.")

(10) La Escuela Militar de Aplicación. [The special service school.] An administrative circular of the War Department.

(11) La Vida Progresiva del Departamento de Fabriles. [Progress in industrial preparedness.]

(12) Las Escuelas de Medicina de México. [Mexican Medical Schools.] Callejas

(13) Los Factores de la Revolución de 1910. [Factors in the Revolution of 1910.] Colonel Berlanga

(14) Joffre y el Marne. [Joffre and the Marne.] (A translated extract from the book of Commandant Muller of the French Army)

(15) La Dificultad de Entenderse. [The difficulty of understanding one another.] Massalia

(16) El Problema de la Población. [The problem of population.] (A French translation)

(17) Vocabulario Militar. [French military glossary.] (IV)

December 1933

(18) La Aviación es una Necesidad en México y su Desarrollo es Fácilmente Practicable. [The importance and practicability of developing Mexican aviation.] Brigadier General Azcárte

(19) El Servicio Militar de Intendencia. Proyecto de una Intendencia Regional. [The Quartermaster Service. A proposed regional organization.] Colonel Aguirre Manjarrez

An historical study of the development of the Quartermaster Service with a detailed examination of the present French organization. The author then proposes a regional plan as the best solution for Mexico.

(20) Milicia Civica o Ejército a Contrata? [A national militia versus the professional army.] v.Oertzen

A translated German article considering the desirability of changing the character of the present Reichswehr to that of militia.

(21) Misión de la Artillerie en el Combate. [The combat missions of the artillery.] Lieut.-Colonel Guzmán Cárdenas

(22) El Tiro de Fusileria Contra los Aeroplanos a Corta Altura. [Small arms fire against low-flying airplanes.] Lieut.-Colonel Garrone, Italian Army

The author examines the doctrines and training methods of the various armies in combatting attack aviation. He concludes the need for greater emphasis on the individual rifleman whose training in firing upon aerial targets has been generally neglected.

(23) La Infanteria Sacrificada. [Our sacrificed infantry.] General Boucher, French Army

(24) Vocabularia Militar. [French military glossary.] (V)

January 1934

(25) Utiles de Guerra Modernos. [The tools of modern warfare.] General Azcárte

(26) Divisiones Pesadas y Divisiones Ligeras. [The heavy versus the light division.] Colonel Garcia

An argument in favor of a light division for Mexico.

(27) Apuntes sobre Organización del Ejército Francés. [Notes on the organization of the French army.] Lieut.-Colonel Alamillo Flores

(28) La Caballeria Americana. [The cavalry of the United States.] Captain Calderón

A study of American cavalry organization with special attention to the work of the Cavalry School and the Cavalry Board.

(29) Cultura Maritima. [Naval science.] Major Gonzalez Alvarez

(30) Los Ejércitos. Están con la Epoca? [Are the armies in har-

mony with the times?] General Manuel Torrea

(31) BREVES CONSIDERACIONES SOBRE EL NUEVO CÓDIGO DE JUSTICIA MILITAR. [Observations concerning the new military penal code.] Linares & Vázquez

REVUE d'ARTILLERIE (France)

BY CAPTAIN F. DURING, INFANTRY

November 1933

(1) PROCÉDÉ RAPIDE DE MISE EN DIRECTION SUR LE NORD PAR L'ETOILE POLAIRE. [A rapid changing of direction of artillery pieces toward the north by the use of the Polar Star.] Lieut.-Colonel Roumegous

The author gives several different ways of making this change, citing advantages and disadvantages. Colonel Gain adds a note to the article to the effect that machine guns can be changed similarly.

(2) LA QUESTION DU MATÉRIEL Á LA CONFÉRENCE DU DÉSARMEMENT. [The question of matériel at the disarmament conference.]

(3) DÉTERMINATION RAPIDE DES CORRECTIONS. [Rapid calculations of corrections.] Captain Etesse

December 1933

(4) L'ARTILLERIE ANTIAÉRIENNE AUX ARMÉES. [Army antiaircraft artillery in 1917.] Lucas

(5) ADAPTATION DES RÉSEAUX RECTILIGNES DE QUEUES DE TRAJECTOIRES AU TIR EN MONTAGNE. [Use of a rectinlinear sheaf of that portion of trajectories near the point of impact for artillery fire in mountainous country.] Captain de Saint Paul

(6) LE CANON MINIATURE "BISHOP." [The "Bishop" field artillery miniature gun.]

(7) RATTACHEMENT DU TIR DANS LE GROUPE. [Cooperation between artillery fires within the battalion.] Captain Fayet

REVUE DE CAVALERIE (France)

BY LIEUT. COLONEL N.B. BRISCOE, Cavalry

January-February 1934

(1) GUERRE DE SÉCESSION. LA POURSUITE DE NASHVILLE (DÉCEMBRE 1864). [War of Secession. The pursuit at Nashville, December 1864.] General Boucherie

A very condensed narrative of the Battle of Nashville and the pursuit by Wilson's Cavalry Corps. No conclusions are drawn, and the same material is available in innumerable writings in English.

(2) MARCHES-MANOEUVRES DE LA 3E D.C. DU 9 AU 20 SEPTEMBRE 1933. [Maneuvers of the 3d Cavalry Division, 9-20 September 1933.] (I) By "X"

This is the first of a series of articles on these maneuvers, giving rather detailed information on the situations, organization, decisions, plans, and execution. It is interesting to see how much more can be learned from this account than from the usual "report" of our own maneuvers.

The maneuvers fell in three periods, with a day of rest between periods, as follows:

(a) 10 to 12 September: maneuver of the cavalry division against another cavalry division, involving a crossing of the Marne;

(b) 14 to 15 September: maneuvers of a groupment of four brigades of cavalry against the combined motorized elements of two divisions;

(c) 17 to 20 September: evolutions of brigades, in the nature of field firing, command post exercises, and artillery firing, culmination of garrison training.

Certain elements of organization are interesting: regiments of five squadrons (troops); each brigade with a platoon of machine guns in track vehicles; each regiment with an antitank gun track-mounted. A total strength of 260 officers, 5,600 men, and 5,300 horses.

In the first phase (see above) we see the march in multiple columns, an active defense, and an order directing reinforcement of an advance guard to form a pivot of maneuver and orders to this force "to contain the enemy and protect the rear of the division" during the attack.

The strength was varied from day to day by transfer of troops from one side to the other.

It is noted that upon a change in the situation the division commander "regrouped" his division, under the protection of an outpost, before

moving forward on the new mission, making two separate operations.

Aviation orders are interesting in that they all direct operations "as soon as visibility will permit," thus accounting for the differences between bright and cloudy mornings, and between clear and foggy weather, instead of assuming daylight to be always one hour before a tabulated sunrise.

Among the things remarked upon by the author are:

A crude terrain map was made, even at night, out in the open at each command post and was of great assistance in coordinating aviation reports and administration. Aviation observers lived with the division staff.

In delaying action Colonel Picard carefully chose some small groups, hid them effectively in the woods, and caused them to allow the enemy advance elements to pass by, then attack the masses in rear. Most effective, but calling for a spirit of self-sacrifice little found and risking the loss of all such generous souls from the regiment. (Better for maneuvers than for war.) An extremely good lesson to the opposing reconnaissance and security elements.

Great progress in radio is noted.

Much information arrived before contact but there was a great dearth thereafter. The author blames this on a lack of officers due to many details on detached service.

(3) LA DÉFENSE DE LA BRÈCHE KLUCK-BÜLOW PAR LES CORPS DE CAVALERIE MARWITZ ET RICHTHOFEN (6-9 SEPTEMBRE 1914). [Defense of the gap between the Armies of v.Kluck and v.Bülow by the cavalry corps of v.Marwitz and v.Richthofen.] (XI) Lieut.-Colonel Pugens

(4) GOUVERNONS VERS LE LARGE. [Let us look at the broad picture.] (I) Colonel Argueyrolles

The author calls attention to the new ideas of time and space forced upon us by mechanized and motorized troops, and to the necessity for the instantaneous and correct decision necessary in such limited time situations. This article is the first of a series showing a proposed defense against an enemy mechanized force. The problem is in large units, groups of armies, and the enemy mechanized and motorized force is more than 15 kilometers long when on the march. It treats of aerial reconnaissance, terrestrial reconnaissance, and distant security, in rather exhaustive discussion.

(5) VITESSE MOYENNE DES COLONNES AUTOMOBILES. [Average speed of motored columns.] Captain Chagette

The writer, by some very interesting equations and a curve, arrives at the conclusion that the most economical combination of speed and distance between vehicles occurs at 20 meters distance and 24 kilometers per hour (23 yards of clear space and 15 miles per hour). He recommends diminution of the number of vehicles by augmenting the individual tonnage for transport vehicles, and for combat vehicles an excess of power for rapid movement when not in column.

REVUE DES FORCES AERIENNES (France)

BY FIRST LIEUTENANT M.D. TAYLOR, F.A.

October 1933

(1) AÉRODYNAMIQUE DE L'AVIATION EMBARQUÉE. [The aerodynamics of naval aviation.] Lieutenant Barjot

In order to reduce the size and tonnage of airplane carriers, it is of vital importance to the navies of the world to reduce the landing speeds of naval aircraft. Early efforts were in the direction of mechanical devices on the carrier. Now the tendency is in the direction of aerodynamic brakes on the airplane itself. Lieutenant Barjot examines the engineering devices being tried out in the principal navies with especial attention to the trailing edge flap and the Zap and Pouit ailerons.

(2) PHOTOGRAPHIE AÉRIENNE. [Aerial photography.] Robert

(3) HISTOIRE DE L'AÉROSTATION. [History of lighter-than-air aviation.] (X) Sedeyn

(4) LES LIMITATIONS PHYSIOLOGIQUES DU VOL. [The physiological limitations of the aviator.] Extracted from a conference by Maior Marshall at the Royal Air School.

(5) PROTECTION DES AVIONS CONTRE LA FOUDRE. [Protection of airplanes from lightning.] A translation of recent instructions issued by the British Air Ministry.

(6) INFLUENCE ET LIMITES PHYSIOLOGIQUES DE LA VITESSE ET DE SES DÉRIVÉES. [Physiological effects of velocity and of its derivatives.] Flamme

This article is the result of extended research on the part of a flight surgeon into the physical effects of rapid flight coupled with rapid accelerations and decelerations.

(7) INFLUENCE DE LA VITESSE DANS LA GUERRE MODERNE. [Influence of mobility on modern warfare.]

(8) L'ATTAQUE EN VOL RASANT. [Attack by low-flying aviation.] Colonel Desmet

The abstract of an article in the September 1933 issue of the "Bulletin Belge des Sciences Militaires" (see RML No. 52, page 83).

(9) LES ORIGINES ET LES TENDANCES DE L'AVIATION EMBARQUÉE. [History and present trends in naval aviation.] Lieutenant Barjot

(10) EMPLOI MILITAIRE DE L'AUTOGIRE À COMMANDE DIRECTE. [Military use of the direct-drive autogiro.]

(11) CAS TYPIQUE D'AGGRAVATION D'ORAGE PAR VENT DE SUD DANS LA VALLÉE DE RHÔNE. [Typical case of the aggravating effect of a south wind on a storm in the Rhone Valley.]

A meteorological study.

(12) FRANCE.—L'APPAREIL PHOTOGRAPHIQUE "GALLUS" POUR LA DÉTERMINATION DES VUES À BORD DES AVIONS. [The "Gallus" photographic instrument for determining the field of vision on board an airplane.]

(13) ETATS-UNIS.—LES DISPOSITIFS GYROSCOPIQUES "SPERRY" DE PILOTAGE AUTOMATIQUE ET LE TOUR DU MONDE DE WILEY POST. [The "Sperry" gyroscopic robot and the Wiley Post around-the-world flight.]

(14) GRANDE-BRETAGNE.—LE LANCE-BOMBES ÉLECTRIQUE "HANDLEY-PAGE." [The electric bomb release developed by Handley-Page.]

November 1933

(15) L'AVIATION ET LES INUNDATIONS. [Use of aviation in effecting inundations.] Rougeron

The author calls attention to the possible use of bombardment aviation against dikes and dams and the consequent destruction due to floods in the territory of the enemy. For such attacks, certain countries are particularly vulnerable, such as Holland and Northern Italy, menaced by the Po. However, almost all countries have regions in which the destruction of a single dam would destroy the sources of electric power and light and spread destruction by the release of impounded water. Such a target would be particularly easy to hit since a bomb striking the water tends to pivot and follow a trajectory roughly parallel to the surface of the water. Thus, a bomb landing from two thousand to twenty-five hundred meters from a dike or dam on the side of the direction of attack would strike its target.

(16) LE CINÉMA ET L'AVIATION. [The use of the moving picture in aviation instruction.] Captain Petitot

(17) HISTOIRE DE L'AÉROSTATION. [History of lighter-than-air aviation.] (XI) Sedeyn

(18) L'AVIATION MILITAIRE AUX COLONIES. [Military aviation in the colonies.]

An extract from the "Revue des Troupes Coloniales," No. 213.

All the European colonial powers have come to use aviation in extending and maintaining order in their colonial possession. In Irak, England depends almost entirely on aviation cooperating with motorized units for the maintenance of order. At present this force consists of only six sections of armored cars of four cars each with the necessary supply vehicles. Its radius of action is 500 kilometers, as it carries food for seven days and gasoline for 600 kilometers. Subsequently supply is provided by the aviation.

The motorized force operates in close liaison with the aviation which, in the course of its reconnaissance, picks up hostile bands, directs the armored cars upon them, and, in the attacks, supports the ground troops with bombs and machine guns. Aviation has frequently transported reinforcements to the size of an infantry battalion. When troops are to be landed in hostile territory, the procedure is to send an advance echelon strong in ma-

chine guns, which is landed and secures a sort of bridgehead for the arrival of subsequent units. When the ground force has been constituted, its supply continues by air.

Similar experiments have been carried out by the Italians in Tripoli and the French in Morocco. In those colonial pacifications, the rôle of the aviation has been:

(a) Distant and extended reconnaissance

(b) Close reconnaissance for ground columns

(c) Liaison between ground columns and rear establishments

(d) Combat with machine guns and bombs

(e) Transportation and supply of infantry.

These missions make desirable the following types of airplanes:

(a) Observation airplanes of wide radius of action

(b) Autogiroes to accompany and bivouac with the ground columns

(c) Transport airplanes

(d) Command airplanes.

(19) GRANDE-BRETAGNE.—LE CANON DE 75MM ET L'APPAREIL "PREDICTOR" DE VICKERS-ARMSTRONGS, POUR LE TIR CONTRE AVIONS. [The new antiaircraft 75-mm. and director produced by Vickers-Armstrong.]

(20) ETATS-UNIS.—LES NOUVEAUX APPAREILS AMÉRICAINS. [The new American airplanes.]

December 1933

(21) L'AVION DE BATAILLE DE DOUHET EST-IL UN ARCHAÏSME? [Is Douhet's conception of a battle airplane out of date?] Lieutenant Bariot

Douhet bases his theories of air strategy upon the use of a multiple-seated, armored bomber equipped with numerous machine guns and cannon for its own defense. Such an airplane would be technically defective because it disregards three principles, namely:

(a) Horizontal speed is of first importance in a bomber

(b) A fixed axially-located weapon is superior to one on a flexible mount

(c) It is impossible to armor an airplane against an explosive projectile.

The air dreadnought as conceived by Douhet is necessarily slow and this lack of speed is a fatal weakness.

(22) ENTREITIEN ET RÉPARATION DU MATÉRIEL VOLANT. [Upkeep and repair of aviation equipment.] Captain Corsel

(23) L'AVIATION ET LA D.C.A. EN 1916. [Antiaircraft defense in 1916.] Major Lucas

(24) HISTOIRE DE L'AÉROSTATION. [History of lighter-than-air aviation.] (XII) Sedeyn

(25) DE PARIS À NOUMÉA. [The Paris—Nouméa flight.] Captain Dévé

(26) ALLEMAGNE.—LE FRANCHISSEMENT DES COURS D'EAU ET L'AVIATION. [River crossings and aviation.]

An extract of recent German regulations insofar as they relate to the defense of river crossings against attack by aviation.

(27) L'AVIATION MILITAIRE EN ALLEMAGNE. [German military aviation.]

(28) BELGIQUE.—MANOEUVRES DE DÉFENSE PASSIVE AU PAYS DE LIÈGE. [Air exercise in the measures of passive defense against aircraft about Liège.]

The report of a Belgian military exercise in which the entire population of Liège participated. It includes a number of experiments with the "Elektron" incendiary bomb.

(29) ETATS-UNIS.—LE RAPPORT PARLEMENTAIRE ANNUEL SUR L'AVIATION MILITAIRE. [United States Congressional report re military aviation.]

(30) LE DÉVELOPPEMENT DÉS AEROPORTS AMÉRICAINS. [The development of American airports.]

(31) GRANDE-BRETAGNE.—CARACTÉRISTIQUES ÉDICTÉES PAR LE MINISTÈRE DE L'AIR BRITANNIQUE POUR LES CARBURANTS. [Specifications for airplane fuels laid by the British Air Ministry.]

(32) VALEUR DÉTONANTE DES CARBURANTS POUR L'AVIATION. [The detonation point of airplane fuels.]

(33) LE TIR AU FUSIL CONTRE LES AVIONS VOLANT À FAIBLE ALTITUDE. [Rifle fire against low-flying aircraft.]

This article summarizes an article by Colonel Garrone in the "Revista Militare Italiana" of February 1933. It concludes the superiority of the rifle over the machine gun against low-flying aviation based upon the results of experiments with towed

balloons. The following table summarizes these results:

	No. balloons used	Rounds fired	Balloons hit	Percentage of balloons hit	Rounds to obtain 1 hit
Machine guns	216	12430	105	48.61	118.38
Rifle	132	1950	130	98.49	15.06

These surprising results are explained by the fact that the individual errors of the riflemen were compensating, which was not true in the case of the machine guns.

(34) LA PHOTOGRAPHIE À CONTRE JOUR DANS LES CLIMATS TROPICAUX. [Photography in the morning and evening in the tropics.]

(35) LA DÉFENSE CONTRE LE VOL EN RASE MOTTES. [Defense against low-flying aviation.]

(36) FRANCE.—LE QUADRIMOTEUR DE BOMBARDEMENT DE NUIT "A.B. 20," DE LA SOCIÉTÉ AÉRIENNE BORDELAISE. [The four-motor night bomber "A.B. 20" of the Bordeaux Air Corporation.]

(37) LA SUSPENSION ÉLASTIQUE "FARMAN," POUR FLOTTEURS D'HYDRAVIONS. [The Farman elastic suspension for hydroplane pontons.]

(38) LE "MOTO-BALLON ZODIAC." [The Zodiac motor balloon.]

(39) ETATS-UNIS.—A PROPOS DU RADIOCOMPAS DE L'ARMÉE AIR CORPS ET DU DISPOSITIF DE PILOTAGE AUTOMATIQUE "SPERRY" UTILISÉS PAR WILEY POST. [The Air Corps radio compass and the Sperry robot used by Wiley Post.]

(40) GRANDE-BRETAGNE.—LE PORTE-AVIONS BRITANNIQUE "FURIOUS." [The British airplane carrier "Furious."]

(41) LE MOTEUR RADIAL SANS SOUPAPES BRISTOL "PERSEUS." [The Bristol "Perseus" radial motor without valves.]

(42) LA BOUGIE ANGLAISE "WIZARD." [The English-made spark plug "Wizard."]

(43) L'HYDRAVION DE RECONNAISSANCE BLACKBURN "PERTH." [The observation hydroplane Blackburn "Perth."]

REVUE d'INFANTERIE (France)

BY CAPTAIN F. DURING, INFANTRY

October 1933

(1) COMBAT EN RETRAITE: REPLI 1918, CAS CONCRET VÉCU. [Rear guard action by the 43d Battalion (164th French Division), on 30 May 1918.] Major M.

(2) RÉFLEXIONS SUR LE COMBAT DES CHARS MODERNES. [Reflections on the combat of modern tanks.] By XX (See abstract, page 29.)

(3) COUP DE MAIN ET TRANSMISSIONS. [Communications during a raid.] Major T

A historical example where raiding troops carried telephones with them and thereby were able to keep up communication with the artillery.

(4) UNE SOLUTION DU THÈME TACTIQUE DONNÉ AU CONCOURS D'ADMISSION À L'ECOLE DE GUERRE. [A tactical problem and its solution.] Major X

This problem was used in 1933 as part of an entrance examination to the Ecole Supérieure de Guerre in 1933.

(5) ANGLETERRE.—LE NOUVEAU RÈGLEMENT D'INFANTERIE BRITANNIQUE. [Great Britain: The new infantry regulations.]

(6) ANGLETERRE.—EXPÉRIENCES D'UN BATAILLON D'INFANTERIE BRITANNIQUE MÉCANISÉ. [Great Britain: Experience of a mechanized infantry battalion.]

November 1933

(7) LE SOLDAT DE 1914. [The soldier of 1914.] Marshal Pétain

Marshal Petain pays tribute to the accomplishments of the infantry and the new artillery tactics in the successful French battles near Nancy, 4 to 20 September 1914.

(8) CHÂTEAU-THIERRY; 2 SEPTEMBRE 1914. [Château Thierry, 2 September 1914.] Laulan

(9) L'INFANTERIE DANS L'ATTAQUE D'UNE POSITION SOMMAIREMENT ORGANISÉE. [Infantry in the attack against a hastily prepared position.] Major Z

(10) LE PROBLÈME DE L'OBSERVATION DANS L'INFANTERIE. [The problem of infantry observation.] Major Mathieu

(11) L'EMPLOI DES TRAINS BLINDÉS. [The employment of armored trains.] Lieutenant Aiby

(12) RUSSIE.—LES NOUVEAUX ÉLÉMENTS DE LA TACTIQUE DE L'ARTILLERIE EN FONCTION DE L'ENGIN MÉCANISÉ. [Russia: Cooperation between artillery and tanks.]

According to Russian views, artillery must assist tanks in their attack. For this reason artillery must be able to change battery positions quickly.

REVUE DU GENIE MILITAIRE

(France)

BY MAJOR P.C. BULLARD, C.E.

January-February 1934

(1) NOTE AU SUJET DE LA FORTIFICATION PERMANENTE. [Remarks on the subject of permanent fortifications.] Colonel Didio

Prevalent ideas upon the subject of permanent fortifications are illogical, and are based upon the general fact, without examining closely into the circumstances, that the Belgian forts failed to stand up under German attack. After the fall of these forts, there was a general denial of the value of fortifications, and this at a time when the whole front was being fortified to the fullest extent. People denied the value of concrete and at the same time praised the use of shelters built of plank and a few shovelfuls of earth. This idea was so strong that the existing fortifications were practically abandoned.

As a result, two of the Verdun forts were captured. Yet, when the remaining forts were rehabilitated, under the orders of General Petain, they rendered valuable service in defense.

Was it not largely the existence of the French fortified front of Belfort — Epinal — Toul — Verdun which led the Germans to violate the neutrality of Belgium and consequently to lead England to align herself against them?

However, it seems that we must abandon the conception of large fortresses which can permit themselves to be invested and can hope to hold with their own means for several months, at least if such fortresses are to be attacked by forces having at their disposal as powerful means as were used in the World War. This is not because the fortifications themselves have no further value, but because the losses inflicted upon that part of the personnel which is not sheltered in the fortifications (and this would include the greater part of the defenders) would be such that in a very short time a garrison not furnished with replacements from the outside would be destroyed. In addition, the quantity of ammunition which could be stored would be insufficient. It would be absolutely essential to have communication with the outside. The large enclosed fortress will probably not be used.

If nations have the money to construct fortifications they will probably try to establish, at certain parts of their frontiers which are particularly menaced, a battlefield prepared in advance and comprising:

Roads and railroads
Signal communications
Observation posts, command posts, and other shelters
Emplacements for machine guns and artillery
Obstacles (wire entanglements, ditches, mine fields, etc.).

Finally, there would be, at certain vital parts of the front, forts capable of resisting for several days in case the front should be pierced. Such forts would block the communications of the enemy and make it impossible for him to hold the ground captured.

With respect to the details of such forts, its parts are not concentrated, but are spread out on the ground, at intervals of some 150 to 200 yards, in order to allow for the zone of dispersion of artillery shells, so that one element may not be struck by fire aimed at some other element.

The elements of the fort should include:

A few long-range guns
Shorter-range artillery
Small-caliber artillery, machine guns, and other automatic weapons for local defense
Turrets, casemates, caponiers, land mines, shelters for personnel

Ditches, wire entanglements, barricades
Antigas protection
Underground communications
Water supply, storage for food and munitions.

(2) TRAVAUX D'INTÉRÊT GÉNÉRAL ÉXECUTÉS PAR LES TROUPES DU GÉNIE EN 1932. [Works of public interest executed by engineer troops in 1932.]

Description of several permanent bridges of various types constructed in France and Northern Africa.

(3) L'INAUGURATION DU MONUMENT AU GÉNÉRAL FERRIÉ. [Unveiling of the monument to General Ferrié.]

In honor of General Ferrié, soldier, engineer, inventor, creator of military radio-telegraphy, there was unveiled a monument in the Champ de Mars, in Paris. The speeches are quoted.

(4) NOTE SUR UNE MÉTHODE D'ÉTUDE ET D'ENSEIGNEMENT DES NOEUDS ET BRÊLAGES, PERMETTANT DE LES EXÉCUTER SANS MONITEUR ET D'EN RETROUVER LA FORME AU MOYEN DE DÉFINITIONS RATIONNELLES. [How to learn knots and lashings without a teacher and to remember them by means of rational names and definitions.] Major Violette

For the more intelligent, and earminded, students.

(5) EXERCISE SUR LA CARTE (SAPEURS-MINEURS): EMPLOI DU GÉNIE A L'ÉCHELON ARMÉE. [Map Problem (engineers): Use of army engineers.]

The situation is that which would have developed in case the German armies had carried out the von Schlieffen plan and had enveloped Paris from the west. The defender's left is called upon to delay the investment of Paris, pending a blow at the attacker's center. The mission of the left flank army is to delay or stop the enemy at the Seine, below Paris, or delay or stop him to the south thereof.

First requirement: Successive defensive positions; organization of the ground, including general dispositions of divisions, works of fortification, and the like.

Second requirement: Plan of demolitions.

The solution will be published in the next number.

(6) MODIFICATIF À L'ARTICLE "DEUX PASSAGES DE VIVE FORCE DE L'AISNE." [Correction to the article, "Two Forced Crossings of the Aisne."]

Curiously, this short correction to an article in a previous number ("Revue du Génie Militaire," January 1924), is one of the most interesting parts of the present number. The modified text is as follows:

The XXXVIII Corps had at that time (October 1918) about 130 feet of light footbridge equipment, of small boats.

The way in which this exceptional equipment was obtained is really interesting and instructive.

In July 1918, the French front in the vicinity of Château-Thierry was along the left bank of the Marne, in a strictly defensive attitude. In spite of this, the commander of the XXXVIII Corps contemplated a possible offensive. Now, he did not have his ponton equipage, which had been given to another large unit. Being thus deprived of any means of rapid crossing of the Marne, he gave orders, on 8 July, to his engineer commander to requisition all the small boats he could find downstream from Château-Thierry, as well as material for flooring, and rope. This matériel was assembled at a selected point about 25 miles below Château-Thierry, and two foot-bridges, each 230 feet long, were built. They were then knocked down into sections suitable for transportation by truck.

The great German attack of 14 July having failed, the army corps commander, foreseeing our immediate resumption of the offensive, had this matériel transported, in three nights beginning 18 July, in twenty trucks, from the point where it had been assembled to a point opposite the crossings to be made at Château-Thierry. The equipment was unloaded and placed in the water in an arm of the Marne called the Fausse Marne, which passes the suburb of Château-Thierry on the left bank.

This flotilla was bombarded by enemy airplanes. General Piarron de Mondésir had foreseen this, but he had thought that the damage could be largely repaired. However, there remained enough equipment

for the construction of two footbridges, which were successfully built at the time of our victorious attack of 21 July. The commander of the XXXVIII Corps then took particular care to have the footbridges withdrawn from use and had them taken apart and loaded on horse-drawn vehicles. Such was the equipment which contributed so effectively to the successful surprise crossing of the Aisne which the 74th Division was called upon to make two months later.

The above-described operation of crossing the Marne is very instructive. The army corps commander practiced the adage: "To command is to foresee."

He demonstrated to commanders of engineers the course to be followed. In all situations, engineer commanders must exercise foresight, sometimes long in advance, and they must induce their commanders also to exercise foresight.

Matériel is not always developed in times of peace as it should be, or perhaps it may be lost. In campaign, engineer equipment should be constantly maintained in condition for the work of today and for the operations of tomorrow.

REVUE MILITAIRE FRANCAISE

(France)

BY MAJOR C.A. WILLOUGHBY, INFANTRY

November 1933

(1) LA DIRECTION DE LA GUERRE DES EMPIRES CENTRAUX. FALKENHAYN (1914-1916). [Conduct of war by Central Powers: Falkenhayn (1914-1916).] Lieut.-Colonel Larcher

A military-historic study of the strategic conduct of operations under the responsibility of Falkenhayn. The opinion is expressed that Falkenhayn missed great opportunities, particularly on the Russian front, where modern means permitted decisive action as compared to the historic attempt of Napoleon in 1812. The decision to concentrate a major effort on the gambler's chance of Verdun is criticized, although the figure of Falkenhayn emerges, from this narrative, less impaired in credit than one should imagine.

(2) LES FABRICATIONS DE GUERRE. [Munitions of war.] Colonel Menu

A critical study of the relations between output of munitions (i.e., industrial mobilization) and military operations and the decisions of high command. The author develops the thesis that insufficiency, inadequacy, and inaccuracy in the flow of munitions, production of armament and general supplies, etc., have constantly effected military decisions to the point of a positive handicap, from 1914 to 1918; he states that G.H.Q. never had available, in a totality, the matériel which it desired for a given operation; in each case, that matériel was delayed for months.

Contrary to current opinion, provisions were made in an industrial mobilization plan, for 1914, to assure a certain rate of munitions production. A daily production of 13,600 rounds of 75's, 465 rounds of 155's, 2,470,000 small-arms cartridges and 24 tons of powder was organized and functioned with apparent ease, as provided for. However, the staggering rate of consumption, under World War conditions, was underestimated. On 19 September 1914, within thirty days of operations, the French artillery had expended 50% of its available ammunition. Joffre advised the Secretary of War, in telegram 6,284 GHQ, 20 September 1914, that ". . . If consumption continues at this rate, our total supplies will be exhausted in six weeks . . either production of artillery ammunition is increased or we shall not have the means to continue active operations beyond 1 November . . ."

The effect upon Joffre's decisions, in the realm of tactical operations, created by the munitions shortage, is traced by the author in several instances, noticeably the Battle of the Yser, when Foch received the order to assume the defensive, because of a lack of ammunition. The 50,000 rounds asked for by Joffre, in September 1914, are not realized until March 1915; consumption increased to 80,000 in that period, and when the rate of production reached anywhere near that figure, in the fall of that year, the battle consumption had again jumped to a still higher figure of nearly 150,000 rounds.

Other instances are cited in monotonous repetition, to show how military operations were repeatedly jeopardized by the discrepancy between rate of production, in the zone of interior, and rate of consumption at the front. This study should be of interest to the G-4 Section.

(3) LA CAVALERIE MODERNE ET SON ÉVOLUTION. [The evolution of modern cavalry.] General Boucherie (See abstract, page 10.)

(4) LES IDÉES DIRECTRICES DE L'ORGANISATION DE L'ARMÉE DE L'AIR. [Organization of an Air-Army.] General Armengaud

An important discussion of factors involved in the organization of an independent air force on major strategic missions; obviously, the point of view is influenced by the situation of France as regards their neighbors, Italy and Germany. Early, concentrated efforts are contemplated, requiring the air force to be in a constant state of combat readiness, even in time of peace. While emphasis is laid on bombers as a favorite type, pursuit planes are still regarded as the best defense against bombers, or attack-aviation, at home or at the front.

December 1933

(5) LA STRATÉGIE ALLEMANDE EN 1918. [German strategy in 1918.] (II) General Loizeau

A critical analysis of Ludendorff's strategic plans for the great offensive in 1918, not wholly favorable to the German commander. The author characterizes Ludendorff's plan, based on (a) a strategic idea: decision against the English, already weakened, north of the Somme; (b) the execution: a single operation, based on a breakthrough, through surprise, in a single locality, to carry operations into the open before the arrival of effective enemy reinforcements. This system had succeeded in the East and in Italy, but it had not previously been tested on the Western Front. (The first instalment of this series appeared in the October 1933 issue.)

(6) LA GUERRE SAINTE DES SENOUSSYA. [The Holy War of the Senoussya.] (Second Part: II) General Meynier

(7) CONTRIBUTION À L'ETUDE DU RÔLE COLONIAL DE L'ARMÉE. [A contribution to the study of the role of Colonial armies.] (II) Intendant Militaire Coanet

The French colonies were of enormous value, economically and in furnishing military man power, during the World War.

(8) FRANCHISSEMENT DES COURS D'EAU EN PÉRIODE DE MOUVEMENT. LA BATAILLE DE LA MEUSE (25 AU 28 AOÛT 1914). [River crossings in open warfare. The Battle of the Meuse, 25 to 28 August 1914.] (I) Colonel Bailly and Captain Gazin

A study of the crossing of the Meuse, 25 to 28 August 1914, on the front of the German Fourth Army, with a view to deducing certain conclusions on the character of such operations in future warfare, on the basis of the present armament of modern armies.

(9) LE SIÉGE DE VIENNE PAR LES TURCS EN 1683. [The siege of Vienna by the Turks, 1683.] Dr. Stoller

RIVISTA DI ARTIGLIERIA E GENIO

(Italy)

BY CAPTAIN F. DURING, INFANTRY

October 1933

(1) PER L'INCREMENTO DEGLI STUDI MILITARI. [To increase the study of military science.] Biondi Morra

The author recommends the innovation of a central institute for the distribution of military matters.

(2) L'ARTIGLIERIA ITALIANA DURANTE E DOPO LA GUERRA EUROPEA. [The Italian artillery during and after the World War.] (I) General Montefinale

In this installment the author gives a resumé of the action of the Italian artillery until November 1917. The distribution of the artillery in the Battle of Gorz, the battles of the Third Army (August-October 1916), and the battle of Bainsizza (August 1916), as well as the advance of the artillery, its strength, missions, actions, and results for the time stated are mentioned.

(3) COOPERAZIONE TRA FANTERIA E ARTIGLIERIA. [Cooperation between infantry and artillery.] Colonel Reisoli

The author is a colonel of infantry and his article is taken from the viewpoint of the infantry. He asks the question: What does the infantry expect from the artillery? Tactical problems, such as advance, advance guard action, attack and defense are considered. The artillery with the advance guard should never counter-battery enemy artillery; this is a function of the divisional artillery. At the beginning of a meeting engagement we should never expect more than a concentrated fire on some isolated strong points from the artillery. The author recommends that infantry and artillery officers become sufficiently acquainted with the functions, etc. of each other's arm, to know their characteristics and capabilities.

(4) L'IMPIEGO DELLA RADIOFONIA PRESSO LE UNITÀ DI ARTIGLIERIA. [The employment of radio telephone by the artillery.] Lieut.-Colonel Telmon

November 1933

(5) L'ARTIGLIERIA ITALIANA DURANTE E DOPO LA GUERRA EUROPEA. [The Italian artillery during and after the World War.] (II) General Montefinale

General Montefinale concludes, in this number, the series of articles on the envelopment of the Italian artillery. He begins with the third phase of the war: from the retreat on the Piave to the battle of Vittorio Veneto and concludes with the period after the War.

Inasmuch as the line of the Piave had been prepared previously for defense, only few modifications were found necessary when the Italian Army was forced to retire to this line. The missions allotted to the artillery holding the line are described at some length. The defensive battle of the Piave was fought in June 1918. After a partial success the Austrians were compelled, after eight days' fighting, to re-cross the Piave. Further fighting from 2 to 5 July compelled the Austrians to fall back to the right bank of the new Piave.

The next period was spent in preparation for the final battle of Vittorio Veneto. Here the artillery distinguished itself after the battle in pursuing the routed Austrians.

In the last chapter the author deals with the post war organization of the artillery.

(6) LA CONTROBATTERIA NELL'AZIONE OFFENSIVA IN TERRENO LIBERO. [Counterbattery in an attack in open terrain.] Colonel Laviano

The artillery commander has twelve planes at his disposal, six of which are used for reconnaissance and six for observing the firing. The author believes this to be inadequate and recommends twelve planes for the artillery commander and another twelve planes for the artillery regimental commander.

(7) LA SPECIALIZZAZIONE E GLI UFFICIALI DEL GENIO. [Specialization and engineer officers.] Major Cappuccini

The author discusses the question as to what extent engineer officers should be allowed to become specialists in one particular branch of their profession. He traces the history of the Corps of Engineers in France and Italy. In Italy the number of engineer officers increased from 50 in 1847, to 6,000 during the World War. Moreover, the number of branches in which officers specialized increased from six to eighteen.

The question of the relative advantages of technical and military training is discussed at some length. The author believes it desirable that an officer should spend part of his time doing technical work and part of his time on strictly military duty.

(8) TATTICA E TECNICA DEI MEZZI RADIO IN GUERRA. [Tactics and technique of the wireless telegraphy.] Captain Manisco

There is unlimited scope for the use of radio transmission, provided it is properly used and controlled. It is essential that all radio stations should be under the control of the higher commanders. Secrecy is the first consideration in the system in larger units, while urgency comes first in smaller units. The advantage of wireless is nullified if time is wasted in coding and decoding messages. Any code adopted must be simple.

(9) LA MARCIA DELLE AUTOCOLONNE. [Truck columns on the march.] Major Amione

A study of the length and speed of columns of motorized vehicles and of the carrying capacity of roads.

December 1933

(10) I TERMINI NUOVI DEL PROBLEMA MILITARE. [Military problems.] Biondi Morra

The author discusses briefly the military problems of Italy under the Fascist regime. While recognizing changes due to scientific progress, he is clearly in favor of the nation in arms, as opposed to a small and entirely mechanized army, which he considers very costly and of an offensive character.

(11) IL TRAFFICO RADIO CAMPALE. [Radio in the field.] Sacco

(12) L'AZIONE DEL FUOCO DI ARTIGLIERIA SUL PERSONALE. [The effect of artillery on live targets.] Colonel Roques

This article deals with the moral effect of artillery fire on troops and is based on experiences on the Western Front. In some cases comparatively small losses from artillery fire have caused considerable more demoralization than did heavier losses under different conditions. The author quotes Voltaire as having said, "It is not so much the number of the enemy killed that gives victory in battle, as the terror inspired in the living," and illustrates this by an incident which occurred on the Western Front in August 1914.

(13) TIRO D'ARTIGLIERIA NEL BUIO E DIFESA DI CITTÀ ATTACCATE DA AEROPLANI. [Antiaircraft fire and defense of a town against attack by enemy aircraft.] Faujas

(14) LE ALTE BENEMERENZE AERONAUTICHE DELL'ARMA DEL GENIO. [The engineers and aviation.] Morelli

The author discusses the development of the Italian aviation and the role which the engineers played in this development.

ROYAL AIR FORCE QUARTERLY (Great Britain)

April 1934

(1) EXTRACTS FROM THE AIR ESTIMATES FOR 1934

(2) THE NEW NATIONALISM. Major Pemberton

(3) THE SOUTHERN DESERT OF IRAQ, 1927/28. (III)

(4) THE CASE FOR THE BOMBER-TRANSPORT AIRCRAFT. Wing-Commander Howard-Williams

(5) A JUNIOR OFFICER DISCUSSES DISARMAMENT. By W.L.D.

(6) NIGHT RECONNAISSANCE. (I) Squadron-Leader Colyer

(7) MARLBOROUGH AND HIS BIOGRAPHY. By C.L.M.

(8) LEAVES FROM AN INDIAN LOGBOOK. By "Nimis"

ROYAL ARMY SERVICE CORPS QUARTERLY (Great Britain)

November 1933

(1) THE SUPPLY OF AMMUNITION TO A DIVISION IN THE APPROACH MARCH

(2) THE RÔLE OF THE M.T. VEHICLE RECEPTION DEPOT (OVERSEAS) IN THE INITIAL STAGES OF A MAJOR EXPEDITION

(3) THE ADVANCED H.T. DEPOT IN WAR

(4) THE OPERATION OF A DIVISIONAL BAGGAGE COMPANY IN AN ADVANCE

(5) R.A.S.C. TRAINING AND THE NEED FOR REALISM

(6) THE PROTECTION OF R.A.S.C. UNITS IN MOBILE WARFARE

(7) THE OPERATION OF R.A.S.C. MOBILE WORKSHOPS IN WAR

(8) FORECASTING AND PROVISION OF SUPPLIES IN PREPARATION FOR WAR

(9) INSTITUTION OF THE ORGANIZATION FOR SUPPLIES ON THE OPENING OF A MAJOR CAMPAIGN

ROYAL ENGINEERS JOURNAL (Great Britain)

March 1934

(1) GIRDER ERECTION OF THE DE MONTMORENCY BRIDGE ACROSS THE JHELUM RIVER AT KHUSHAB, INDIA. Captain Simpson

(2) TEMPORARY ROADS DEPARTMENT.—III. A NEW METHOD OF SURVEY FOR ROADS. By "Roadsurvey"

(3) THE EFFECT OF MODERN METHOD AND MACHINERY ON ROAD-MAKING IN WAR. (Communicated by the R.E. Board)

(4) THE WAR OFFICE EXPERIMENTAL CONVOY, 1933. Lieutenant Drayson

(5) TEN DAYS IN JEHOL. By Anon

(6) BLASTING WORK ON THE SUEZ-ZAFARANA ROAD, CARRIED OUT BY

THE 42ND FIELD COMPANY, R.E., 1933. Lieutenant White

(7) THE CROSSING OF THE VARDAR NEAR PARDOVICA, 24TH SEPTEMBER, 1918. Lieutenant McBride

(8) ENGINEER TROOPS, SUDAN DEFENCE FORCE. Lieutenant Knott

ROYAL TANK CORPS JOURNAL (Great Britain)

March 1934

(1) SUMMARY OF TANK OPERATIONS, 1916-1918. (I) Major-General Fuller

April 1934

(2) TANKS IN NIGHT STUNT. Major Heseltine

(3) SUMMARY OF TANK OPERATIONS, 1916-1918. (II) Major-General Fuller

SIGNAL CORPS BULLETIN

March-April 1934

(1) MECHANIZATION OF COMBAT UNITS. Major Marsh

(2) MOBILE COMMUNICATION FOR MECHANIZED CAVALRY. 1st Lieutenant Withers

(3) RADIO IN WAR. Major General Harbord

(4) THE CONTRIBUTION OF THE CRYPTOGRAPHIC BUREAUS IN THE WORLD WAR. (III) Gyldén

WEHR UND WAFFEN (Germany)

BY CAPTAIN F. DURING, INFANTRY

October 1933

(1) NEUZEITLICHE KORPSARTILLERIE. [Modern corps artillery.]

Translation of an article by General Challeat which was published in the "Revue d'Artillerie," February 1933. (See QRML No. 48, page 27.)

(2) DURCHSCHUTZ VON PANZERN. [Penetration of armor.] Captain Gallwitz

(3) ARTILLERISTISCHE SONDERVERWENDUNG VON PANZERZÜGEN. [The use of armored trains by artillery.] Captain Wagner, Retired

The author speaks of the possibility of using armored trains to bring artillery forward and the use of the train as an obstacle in mountain warfare and coast defense. Artillery in armored trains is always in position to fire and should be used as mobile reserve to be shifted as the situation warrants.

(4) BALLISTISCHE RECHENAPPARATE. [Apparatus for calculating ballistics.] Wehage

(5) KAMPFWAGEN UND PIONIERE. [Tanks and engineers.] (I) Lieut.-Colonel Kubitza

(6) DIE EISENBAHNANLAGEN UM THORN. [Thorn and its railways.] Ferrarius

(7) WICHTIGES AUS FREMDEN HEEREN. [Important foreign railroad construction after the War.]

This article deals with the African railways of France, which, it states, will "open up undreamed-of military possibilities for France in a European war by guaranteeing the quickest supply of Colonial troops from the inexhaustible black reservoir.

Recent improvements in rapid transport have brought Algiers within thirty-seven hours of Paris. This route, owing to its ability to supply Paris with fresh vegetables from North Africa, is called, not without humor, "the Vegetable Line." The steamer portion of it is doubled by ships plying between Marseilles and Biserta, thus connecting with Tunis by train.

The first of French railways in North-Africa is the so-called coastal line, which starts at the harbor of Sousse, and runs thence, connecting the headquarters of one corps, of four divisions and nine brigades, to Tunis, inland to Constantine, to Algiers, Oran, and to Oujida, where it enters Morocco. The line from Oujida to Fez is not due for completion until 1936, but the first one-third of it, from Oujida to Guercif, has been in use since 1932. From Guercif to Tasa (also a divisional headquarters) the work has progressed well, and between Tasa and Fez (divisional headquarters) the work has started. From Fez there is a railway completed in 1927 by the Société Franco-Espagnole des Chemins de Fer connecting with Tangier. From there, too, a year later was completed the great railway through Meknes to Rabat, and thence via Casablanca to Marakesh, which will be an extension of the great coastal line as soon as Tasa and Fez are connected.

Important as this railway is, it will have to take second place

politically and economically to the projected Trans-Sahara railway. This was originally planned to run from Constantine, via Biskra, Togourt, and the Italian oasis of Ghat to Lake Chad. Military objections over-ruled, and the northern outlets of the Trans-Sahara railway will now be the harbors of Algiers, Oran, and Nemours, while new construction commences at Bu Arfa, the terminus of an existing branch line from Oujida. From Bu Arfa the trace runs, Ugarta Oasis, Twat, Reggan Oasis, then approximately 280 miles of desert to the Sudan boundary at Tessalit Oasis, and the shortest route to the Niger—in fact very much the Sabatier-route, and about 150 miles east of the Timbuctoo to Colomb Béchar crossing by the Estienne Brothers in 1925. The Niger having been reached at In-Tassait, one branch will run west up the river and meet at Segu the line from Dakar, picking up the Ivory Coast and New Guinea railway extensions, while the main line continues south to join the Dahomey railway and so to reach the Bight of Benin. The work is estimated to take eight years.

November 1933

(8) ZUR FRAGE DER WINKELTEILUNG. [The question of angular measurement.] Maurer

(9) ZUKUNFTSSORGEN UND ZUKUNFTSPFLICHTEN DER ARTILLERIE. [Future cares and duties of the artillery.] By "Z"

The artillery deals with the increased importance of the artillery arm in modern warfare. During the war artillery preparation in the attack was much curtailed, while both attacker and defender made extended use of camouflage, which prevented the artillery from having flexibility. Instead of being confined to covered positions, it could be in position anywhere if properly camouflaged. Mobility is very important and the acompanying artllery in the attack must be able to go where it is needed, without waiting for the engineers to open up a road. This also applies to artillery on the defense. An immobile defense will fail before every attack. The masked fixed position has given way to camouflaged movable position to such an extent as to defeat air observation.

(10) DIE FELDARTILLERIE DER VEREINIGTEN STAATEN VON AMERIKA. [The field artillery of the United States.] (I) Colonel Blümner, Retired

(11) AUTOMATISCHES LACKIEREN VON GESCHOSSEN UND GESCHOSZHÜLSEN. [Automatic paint spraying of projectiles.] Klose

(12) KAMPFWAGEN UND PIONIERE. [Tanks and engineers.] (II) Lieut.-Colonel Kubitsa

The author demands for the tanks, as for infantry and cavalry divisions, their own engineers, organically assigned. They should be fitted for the job by equipment, training, and organization. If obstacles to be crossed are larger than the tank engineers can deal with, the work should be done by divisional engineers. Considering the extra work divisional engineers have to perform in connection with tanks, the author recommends that a fourth company of engineers be added to every division. This is in addition to the engineers allotted to tanks. The author believes that engineers are the cardinal point of the whole motorization problem.

(13) NEBELMITTEL DER FLUGZEUGE. [Smoke by airplanes.] (I) Major General v.Tempelhoff, Retired

December 1933

(14) DIE FELDARTILLERIE DER VEREINIGTEN STAATEN VON AMERIKA. [The field artillery of the United States.] (II) Colonel Blümner, Retired

(15) VERSORGUNG EINER VERKRAFTETEN AUFKLÄRUNGSABTEILUNG. [Supply of reinforced reconnaissance detachments.] By "S"

The author discusses various ways of supplying distant reconnaissance detachments, which precede troops by several days. He comes to the conclusion that the best way of supplying such a detachment is to have it carry one extra day of supplies of all classes on ten 3-ton trucks and to have the trucks go back to the most advanced elements of the army in order to pick up additional supplies.

(16) E-FLAK. [Railway antiaircraft guns.] Captain Wagner, Retired

Recently in the Far East the Japanese bombing squadrons destroyed no less than four Chinese railway centers in less than six weeks. It is certain that in future wars railroad junctions will receive more and more attention from bombers and the consideration of effective protection against such attack becomes of paramount importance. An antiaircraft gun can either be mounted on a large cross-country truck or on a railway truck. The latter has many advantages. In the first case the caliber of the gun is limited by consideration of weight, as affecting mobility. The vehicle itself must not be too heavy. A day's supply of ammunition of 300 rounds weighs about 3 tons. These disadvantages disappear if the gun is mounted on a railway truck. The caliber can be increased from 7.62 to 8.8 or even to 10.15 and plenty of ammunition can be carried at the same time. The train can also be armored to an extent that is impossible with a cross-country vehicle. Command posts, range finders, searchlights, etc., are permanently installed on this train.

An antiaircraft train may consist of 2 trucks or cars containing two 10.5 antiaircraft guns each; a range finder, a searchlight, and either two 3.7 antiaircraft guns or two large caliber machine guns, coupled together on a special mounting, are also carried on each car. The question of concealment is very important. The usual camouflage painting has little effect, since any train on rails in the open can easily be recognized by aviators. Therefore trains should be in sheds, tunnels, or on short sidings in woods, leaving such cover to come into action only when the alarm is given.

(17) DER ERSTE GROSZFLUGZEUG-DIESELMOTOR. [The first large traffic airplane Diesel engine.] van Steewen

(18) NEBELMITTEL DER FLUGZEUGE. [Smoke by airplanes.] Major v.Tempelhoff

WISSEN UND WEHR (Germany)

BY CAPTAIN F. DURING, INFANTRY

December 1933

(1) DEUTSCHLANDS AUSTRITT AUS DEM VÖLKERBUND. GRÜNDE UND WIRKUNGEN. [Germany's withdrawal from the League of Nations. Cause and effect.] v.Rheinhaben

(2) STAATSMANN UND FELDHERR, ERLÄUTERET AN DEM VERHÄLTNIS ZWISCHEN BISMARCK UND MOLTKE. [Statesman and field marshal. Relation between Bismarck and Moltke.] Major Lindemann

(3) DER WILLE ZUM SIEG. [The will to conquer.] Leppa (From Auerstedt to Ratkau, 1806.)

(4) DIE ITALIENISCHEN GROSZEN MANÖVER 1933. [The Italian maneuvers, 1933.] (See abstract, page 35.)

(5) DIE BETEILIGUNG RUSSISCHER TRUPPEN AN DER EROBERUNG DER MEERENGEN. [The Russian troops in the struggle for the possession of the Bosporus Straits.] Frantz

January 1934

(6) WEHRPFLICHT UND WEHRWILLE IN DER DEUTSCHEN GESCHICHTE. [Compulsory service and willingness to serve in Germany.] Frauenholz

(7) DIE ENTWICKLUNG DER WEHRKRAFT IN EINIGEN EUROPÄISCHEN LÄNDERN 1930 BIS 1952. [Military effectives in Europe from 1930-1952.] Captain Donle

The author discusses in an interesting article the available man power of several European states from 1930 to 1952. The figures are derived by taking the number of births of all males and deducting from it the estimated death rate (based on statistics) for the first 20 years. From this total the author deducted the percentage of physically disqualified for military service, which, according to statistics is 30% for all nations, with the exception of France, where it is 28%. The final total gives the man power for the years mentioned and is contained in the following table. A considerable drop in man power is seen for the years 1935 to 1938, which is due to the small birth rate during the War.

TABLE OF MAN POWER, 1930-1952

Year	Italy	Holland	Austria	Germany	France	Belgium	Poland	Czechoslovakia
1930	305,000	50,000	49,000	518,000	234,000	53,000	280,000	133,000
1931	292,000	49,000	46,000	503,000	224,000	51,000	280,000	131,000
1932	303,000	50,000	46,000	504,000	239,000	51,000	280,000	128,000
1933	300,000	49,000	45,000	494,000	226,000	51,000	272,000	127,000
1934	297,000	52,000	43,000	489,000	221,000	47,000	265,000	125,000
1935	296,000	49,000	34,000	383,000	129,000	37,000	194,000	79,000
1936	235,000	50,000	27,000	281,000	105,000	30,000	176,000	57,000
1937	185,000	51,000	25,000	255,000	114,000	26,000	163,000	52,000
1938	171,000	48,000	25,000	262,000	134,000	25,000	161,000	48,000
1939	206,000	48,000	32,000	354,000	135,000	37,000	212,000	83,000
1940	311,000	57,000	40,000	482,000	253,000	49,000	227,000	99,000
1941	299,000	55,000	41,000	470,000	246,000	50,000	232,000	110,000
1942	301,000	53,000	43,000	422,000	230,000	47,000	260,000	107,000
1943	296,000	55,000	42,000	390,000	231,000	47,000	269,000	104,000
1944	300,000	53,000	41,000	382,000	229,000	46,000	262,000	99,000
1945	296,000	52,000	39,000	388,000	234,000	46,000	273,000	97,000
1946	292,000	52,000	37,000	367,000	233,000	45,000	259,000	96,000
1947	293,000	51,000	34,000	348,000	225,000	44,000	252,000	92,000
1948	288,000	52,000	34,000	355,000	228,000	44,000	260,000	92,000
1949	277,000	52,000	32,000	344,000	222,000	44,000	260,000	90,000
1950	292,000	54,000	32,000	338,000	227,000	45,000	270,000	91,000
1951	274,000	52,000	31,000	309,000	222,000	44,000	252,000	88,000
1952	266,000	53,000	29,000	292,000	220,000	44,000	244,000	86,000

(8) Die Division de Curten während der sieben Kampftage vor Le Mans vom 6. bis 12. Januar 1871. [The division of General de Curten in front of Le Mans from 6 to 12 January 1871.] Neumeister

(9) Englands und Frankreichs Werben um Belgien 1906 bis 1914. [The endeavor of France and England to come to an agreement with Belgium from 1906 to 1914.] Kabisch

(10) Entwicklung des Verhältnisses zwischen Heer und Faschismus in Italien seit Sommer 1933. [The relations between the army and Fascists in Italy since the summer of 1933.]

CURRENT HISTORY

May 1934

(1) What Japan wants. Eldridge

(2) What is the Army worth? Captain Colby

FOREIGN AFFAIRS

April 1934

(1) The future of the Saar. .vKühlmann

(2) Amending the Platt Amendment. Guggenheim

(3) Britain's trade war with Japan. Kawakami

FOREIGN POLICY ASSOCIATION: FOREIGN POLICY REPORTS

28 February 1934

(1) Samoa: Islands of conflict. Keesing

14 March 1934

(2) Ship subsidies and the future of world shipping. de Wilde

28 March 1934

(3) The foreign policy of the Third Reich. Wertheimer

11 April 1934

(4) Impending naval rivalry. Stone

25 April 1934

(5) The dismemberment of China. Bisson

9 May 1934

(6) Toward a new balance of power in Europe. Dean

Section 4

ORIGINAL MILITARY STUDIES

This section contains original contributions by graduates of the Command and General Staff School.

A SCIENCE OF WAR*

By Major E. S. Johnston, Infantry

I.—The Need of a Science of War

In war the main questions which harass soldiers relate to actual fighting and to supply. In peace the primary question which should occupy the energies of an army is training

*EDITORIAL NOTE: Marshal Maurice de Saxe, in his *Reveries*, published in 1757, after his death had ended a long and very successful military career, remarked in his Preface: "War is a science so obscure and imperfect" that "custom and prejudice, confirmed by ignorance, are its sole foundation and support. All other sciences are established upon fixed principles . . . while this alone remains destitute; and so far from meeting with anything fundamental amongst the celebrated captains who have written upon this subject, we find their works not only altogether deficient in this respect, but also so involved and undigested that it requires very great gifts, as well as application, to be able to understand them . . ."

Marshal Saxe has thus noted, as present in his day, that peculiar confusion of thought which still obtains among military men as to the fundamental approach, not only to war, but to any practical problem. Military writers and teachers constantly employ such phrases as "principles," "basic principles," or "a few simple and fundamental principles" of war; but what they actually deal in is neither basic nor simple,—it is a mass of incompletely organized precepts. These precepts are really suggestions as to methods, and are not principles at all, unless indeed there is no difference between principles and methods—a difference which our highest military authorities nevertheless insist on.

The effort to isolate the basic principles of war, as suggested by Marshal Saxe, was given impetus after the World War by a distinguished British soldier, Major General J.F.C. Fuller, in his *Foundations of the Science of War*. This work laid the basis for all future efforts on this subject, and, if studied by soldiers generally, would do much to clarify thought and to make tactical training more simple and practical.

Further efforts were made along the same line by that well-known British writer on military subjects, Captain B.H. Liddell Hart, in his *Science of Infantry Tactics, Simplified*. At one time Captain Liddell Hart almost abandoned the struggle, but he has returned to it again and again, apparently impelled to it by the inescapable logic of the situation. In all his recent books, which have reached a very high plane of military history and commentary, and have excited interest and approval in civilian historical circles, he again and again emphasizes the practical value of such a simple, but correct, and therefore scientific, synthesis of war.

This article is a further effort in that direction.

for war. Consequently, whether in war or peace, in training or in campaign, the soldier's primary intellectual problems are, in any given situation, as follows:

To fight or not to fight?
If we fight, where? When? How?
In any case, how to effect supply and evacuation?

To answer these questions, there has been published a mass of official and unofficial documents; there has been established, also, in our country, an elaborate system of service schools.

The officer, who, after more or less service, finds himself commanding troops in war or in maneuvers, or who takes a course at a service school, does not bring to his problem a blank mind. On the contrary, he has a brain stored, like an old house, with furnishings old and new—with new, solid, and substantial furniture which takes the eye and attracts the attention, however useful or otherwise it may be; with old and worn pieces, patched but still giving service; with miscellaneous litter, some of it put aside and almost forgotten, but not yet thrown away.

All of these things the soldier has—the furnishings of his mind, the gleanings of his professional study and experience. But one thing he does not have—he has no *inventory*.

He has no definite and practical classification of his stock on hand. He has no systematic method of going over his store of knowledge, and of selecting what is needed for his particular purpose at the time.

Worse than this, he has no systematic method of periodically going over his mental possessions, and of rearranging them and classifying them for quick, effective, practical use. And so, like an old outfit long in garrison and not subjected to the periodic test of maneuvers or campaign, he trails behind him a lumbering string of vehicles, packed with miscellaneous parafernalia which have served their purpose in the past, but can serve no useful purpose in the present, and will certainly decrease the mobility of the unit it is supposed to serve.

The only way to prevent the accumulation of such mental impedimenta is to institute a frequent inventory whereby each article may have its serviceability tested, and—if it fails

to pass the test—be dispassionately consigned to the dump, with however great sentimental regret.

The only way to make such an inventory is by listing the articles according to a methodical system. The only way to test their usefulness is by a standard of practical values. Both these operations, then, require an *organization of the available facts.*

Such an organization of mental facts—such an organization of knowledge—is a *science.*

Let us see whether we have available, anywhere, an organization of our military knowledge—that is, a *science of war.*

According to high authority, the foundation of good military practice and the test of military doctrines and methods are certain "principles" as to which we are informed that: "while the fundamental principles of war are neither very numerous nor complex, their application may be difficult and must not be limited by set rules. Departure from prescribed methods is at times necessary. A thorough knowledge of the principles of war and their application enables the leader to decide when such departure should be made and determine what methods should bring success."[1]

What are these "principles" which underlie the methods of war? How do they differ from the "methods"? The same authority tells us that the "basic principles of the combat tactics of the different arms are set forth in the Training Regulations of those Arms." Presumably these include the Training Regulations entitled "Combat Principles."[2] Yet a careful reading of these regulations shows us that they are in fact devoted to certain suggestions as to procedures for combat. Which of these are "principles"? Which are methods? Is there in fact any difference?

This is a matter of supreme importance, for, as is indicated in the passages quoted above (from the Field Service Regulations, 1923), principles apparently do not change, but methods change to fit circumstances. Obviously if this passage means anything, it means that we must learn to distinguish between principles and methods.

[1] FSR, 1923, p. III.
[2] For example, TR 420-105 *et seq.*

Can we, in fact, find in the Field Service Regulations certain things that are principles, and certain others that are methods?

"The coordinating principle which underlies the employment of the combined arms is that the mission of the infantry is the mission of the entire force."[3] Is this always true? Is it true of a large cavalry force, reinforced with a relatively small detachment of infantry? Is it true of a mechanized unit, including a proportion of machine-gunners (infantry) who are utilized for dismounted action? Obviously, it is not true in all cases.

"In principle, light artillery is assigned to infantry and cavalry divisions, medium artillery to corps, and heavy artillery to the GHQ reserve."[4] Obviously, this depends on many circumstances: the size of the division, the character of the theater, the nature of the enemy, the mission of the division. The German division includes, organically, both light and medium artillery; so does the French. What does "in principle" mean in this case? It means "as a general rule"; it means that there may be exceptions; it means that this is a *method* generally applicable—it does *not* mean that this is a principle.

The Field Service Regulations contains thousands of similar pithy statements. Which of these are "principles" (that is, invariable facts)? Certainly, few of them are. Are these few anywhere isolated from the mass? emphasized? arranged? summarized? *organized?* Where are these "fundamental principles of war which are neither very numerous nor complex"? We do not find them succinctly stated in the Field Service Regulations. Are they stated plainly in any other publication?

Certain immutable principles of war were once named in Training Regulations, but they have since disappeared.[5] Important as these principles must be, we now search in vain to find them plainly stated. Our case is like that of the British officer who wrote that he found in his Field Service Regulations (1909) the following statement: "The fundamental principles of war are neither very numerous nor in themselves

[3] FSR, 1923, par. 44.
[4] FSR, 1923, par. 75.
[5] TR 10-5 (amended 15 Aug., 28).

very abstruse, but the application of them is difficult, and cannot be made subject to rules. The correct application of principles to circumstances is the outcome of sound military knowledge, built up by study and practice until it has become an instinct." This, says our informant, was excellent (so excellent, we might add, that it seems to have found its way, with minor changes of phrasing, into our own Field Service Regulations of 1923); but he was unable to find these principles in the official documents.[6] He therefore proceeded to work out some of his own, which were in 1924 incorporated in British Field Service Regulations.[7]

But if these principles are not set out definitely in the official texts, perhaps we shall find them taught in the schools. Let us see what principles are established in the minds of experienced officers, of ten or more years' service, who have been students at one of our higher service schools.

Here, for instance, was an able, thoughtful officer who had formed the view from years of study and application that the best way to protect anything was invariably to stay near it. His amazement can be better imagined than described on encountering a case where the best way to protect the flank of an army was to march rapidly away from it.

Another officer regarded it as gospel that combat aviation is not to be used against targets which can be reached by artillery. He applied this as an inflexible rule, and was mystified by a case where attack aviation was used against a close-in target because the artillery fire was needed elsewhere.

Others, again, recalling a case where an attacking army needed twelve hours to make considerable changes in its dispositions, objected to a change of direction three times in one day on the part of an army on the march, even though the alternative was to let a defeated enemy escape.

Yet another officer had noted that during 1914, 1915, 1916, and 1917, penetrations by large forces appear to have reached their limit when the depth equalled one-half of the base. From this fact he derived an inflexible rule that no penetration is to be attempted on a front less than twice its projected depth. Of course there is no sovereign virtue in the geometry of this concept, nor were the dimensions of

[6]Fuller, p. 13.
[7]Maurice, p. 38.

actual penetrations exactly as described by the rule; the basic factors were not geometrical in nature, but rather were related to armament as it existed in those years of the World War, and to the presence of large reserves. Nor did such limitations ever apply to *all* units; had this been so, the tactics of infiltration by smaller infantry units would have been impossible—a platoon could never have penetrated, alone, successfully, to a depth much greater than seventy-five yards, whereas we know they did; an individual soldier could not have progressed successfully more than a few yards forward, whereas we know they did; in fact, Sergeant York appears to have gone through a small gap to a depth of several hundred yards, and then returned, by another route, making a large gap as he came out. The application of this general guide as to the dimensions of a penetration also fails in late 1918, when applied to relatively large forces, owing to the decline of German morale and the diminution of German reserves.

Many other examples could be given of the invention and use of faulty rules similar to those cited above.

It is a commonplace at service schools that "students want a rule, not a principle." The student wants something that he can apply invariably. What the faculty is accustomed to give him, however, is a general guide, applicable *with exceptions to suit the existing situation.* Is such a general guide a "principle" in the sense of the passage quoted from Field Service Regulations? Obviously, it is not. And just as obviously, the invariable rule desired by the student *is* a principle according to the meaning of that term as employed in Field Service Regulations. Why, then, do not school faculties provide the type of principle which is referred to by this high authority? The inference is pretty clear that the faculties do not do so, because they can not find such principles set out in plain terms in the official regulations.

If the students and faculties of our service schools are in doubt as to what are in fact the principles of war, perhaps nevertheless we can discover them by searching the minds of distinguished soldiers and sailors.

Admiral Fiske gives an example in a discussion of the decision to divide the fleet between the Atlantic and Pacific Oceans. It appears that our Navy Department was rent by controversy over this proposal, the opposition to such a

distribution being based on the old maxim "Never separate your forces." Admiral Fiske makes the point that such a maxim is not to be taken literally, and that its application calls for many exceptions which are taken (by the well-informed) as implied in any such "principle." He points out that this maxim is only a partial truth, and that, taken as it stands, it is a dangerous misstatement.[8]

The difficulty here is that such a rule is stated as if there were no exceptions, and that it always involves, therefore, the danger of being applied as if there were no exceptions.

Let us now investigate certain phases of the World War.

We know that the French and Austrians, prior to the World War, treated the offensive as an invariable rule of action, and, by a process of psychological conditioning, convinced themselves that success would always attend a headlong attack. Logically indefensible, this idea rested rather on a wish than on reason, and on the implication that the available human material was inherently superior to that of the enemy: very often a dangerous assumption. From top to bottom of the military hierarchy this obsession influenced action disastrously in these two countries in 1914, and for a long time thereafter. The French soldier was untrained for anything but a headlong attack, with the result that in the first two months of the war (about two-fiftieths of its total length) the French army suffered two-fifths of its total war losses. French man-power will reach its lowest ebb in 1936. Marshal Foch, who was instrumental in saturating French military pre-war thought with this false doctrine, himself denounced it in later years. These misfortunes were due to the fact that the general staffs had captivated themselves with the simple though delusive belief *that there is one principle of war: the offensive.*[9]

That is what a part-truth can do to a nation. That is the danger of general guides, subject to exception. That is the danger of exalting a method, a procedure, like the offensive, into an invariable rule.

The Germans, invading France in 1914, had an excellent opportunity, according to General Gallieni, defender of Paris,

[8] Fiske, p. 293.

[9] *Journal Officiel*, Documents Parlementaires, 29 Mars 1920; Churchill, pp. 159 *et seq;* Seely, *Adventure*, p. 199 *et seq;* Spears, p. 38. Muller, pp. 42, 60-61; Recouly, pp. 86-87; Maurice, p. 119.

to seize that city, in which case Gallieni was sure the French government would have surrendered. The Germans also failed to seize the channel ports when these ports were practically in their hands, and later suffered very heavy losses in the effort to take them. General von Kluck ascribed these errors to the fact that the Germans believed that the *objective is always the enemy main forces.*[10]

That the World War occasioned much criticism of the mental outlook and the thinking processes of professional soldiers, is only too well known. This criticism has of late been emphasized by the writings of soldiers who were at the time commanders in the junior grades.

The relations between Lloyd George, as British Prime Minister, and Sir William Robertson, as Chief of the Imperial General Staff, are especially illuminating. Robertson records that he found it very difficult to satisfy the inquiries of the Cabinet as to the conduct of the war. Certain ministers complained that his answers were not sufficiently precise.

The questing intelligence of the civilian ministers was always demanding "Why?"; and they could not be satisfied with the answer that so and so was an established "principle." The fact that Great Captains had said such and such, or that the higher military schools taught so and so, merely elicited from them the further question, "Why was (or is) that so?"

As to this attitude, Robertson says, "All that he (the military expert) can do is to give his convictions, and with them Ministers ought to be content." The fallacy of this view he then exposes, himself, in his conclusions, where he states: "The real headquarters of armies in these days are not to be found in the field abroad, but at the seat of the government at home; and plans of campaign are, and must be, now analyzed and criticized by civilian Ministers in a way quite unknown a few decades ago. The military chief must be prepared to expound and justify, lucidly and patiently, the plans for which he seeks ministerial sanction, and he must also be prepared to explain and substantiate his objections to such alternative plans as Ministers themselves may suggest."

In the controversy with Mr. Lloyd George as to the Saloniki expedition, Sir William Robertson was unable to

[10]Seely, *Fear and Be Slain*, pp. 218 *et seq.*

formulate his objections so that the Cabinet could understand them. Right or wrong, his difficulty was that he could not give definite reasons. As he wrote to Haig: "My views are known to you. They have always been defensive in all theaters but the West. But the difficulty is to *prove* the wisdom of this, now that Russia is out. I confess that I stick to it more because I see nothing better, and because my instinct prompts me to stick to it, than because of any good argument by which I can support it."[11]

Major General the Honorable J.E.B. Seeley, who was British Secretary of State for War during the years immediately preceding the World War, and who served through the war as a GHQ staff officer and (for the most part) as a commander of troops, emphasizes as the most serious defect of the British high command and of professional army officers generally, the tendency to apply certain hoary maxims literally, without regard to actual conditions. He regards this tendency (which we have seen is common among students at our peace-time schools) as responsible for many serious basic errors in the conduct of the war, and for much unnecessary loss of life and treasure. He believes the proper corrective action to be to insist that one must divest his mind of all such maxims, and face the facts as they are, applying common sense, based on a knowledge of the characteristics of the means available, in order to reach a correct decision.[12]

Admiral Fiske would use the maxims as general guides, recognizing necessary exceptions. General Seeley would abolish the maxims altogether.

Let us investigate these two proposals.

That human beings tend to treat general guides as invariable rules, is a truism. That is why religious wars, for example, have been so bitter. Each side regards its dogma as a basic and invariable truth, as to which no concessions can be made, and for which no sacrifice is too great. This tendency is rooted deep in human nature.

There is, in fact, no race of human beings so primitive that they do not appreciate that like causes produce like effects; that our universe is so constructed that this is always so. Even the subhuman stages of living beings appreciate

[11]Robertson, Vol. I, p. 183; Vol. II, pp. 255, 302.
[12]Seeley, *Fear and Be Slain*, p. 218.

this fact. It is the basis of individual and group habits. The difference between forward and backward peoples is that the former regard the forces of nature as impersonal, and make a conscious effort to discover the laws that condition them and to use these facts to increase the fullness of life; whereas, the backward peoples tend to attribute these conditions to the will of God (or to the intervention of devils), and endeavor to accept them fatalistically as facts that can not be altered.[13]

It is the nature of man to apply rules, guides, "principles", opinions, maxims, etc., as invariable; and particularly is this true when under stress of fear, hunger, thirst, or urgency of any sort. And strain is normal in war.

It is therefore a fact that human beings instinctively search for invariable rules, because such rules provide guides *without exception,* and because they save time and trouble. Particularly is this the case in the heat and turmoil of active life, when thinking must be most rapid and most accurate—and yet when it is most difficult to think accurately and rapidly. Therefore, a faulty statement of fact, postulated as if it were an unchanging principle, is especially dangerous, because of the inevitable human tendency to treat any guide, however imperfect, as an invariable rule. This tendency is pronounced because it involves least thought, and because thinking is always hard work, and is especially difficult under the stress of war. It is for this reason that the use of general guides which are subject to exception, has caused endless difficulty, and also that we see these difficulties daily in our schools, and repeated endlessly in the history of war.

Hence, neither Admiral Fiske's nor General Seely's solution is practical. Human beings invariably tend, especially when under strain, to apply guides for conduct literally; and if not furnished such guides by someone in authority, will provide them for themselves. Hence it is necessary, first, *to make such generalizations available,* and second, *to make sure that they are correct;* for otherwise, commanders, being human, will evolve their own guides, which guides will often be *false.*

Hence the need for unchanging principles, in the sense in which that term is employed in the Field Service Regulations, which will organize our knowledge, show the relations existing

[13]Hocking, p. 12.

among our facts, and provide us with invariable guides for action under the conditions of strain which are normal in war.

Of course, if we can not work out such invariable guides, that is the end of it. The Field Service Regulations must then be admitted to have raised hopes which can not be attained. But it would be strange indeed if we could not evolve such principles. They are well known in all other human activities. The meaning attached to a "principle" by the Field Service Regulations is precisely that in which the term is used among those remarkable persons whose researches have endowed us with railways, automobiles, electric mechanisms, and all the other adjuncts of modern civilization. To these scientific men a principle is a *basic and invariable truth,* which enables us to *organize our knowledge:* that is, to build a *science,* and then to apply this organized knowledge more swiftly and surely when we put it into practice as an *art.*

The basic factors which influence the operations of war are quite well known; we deal with them constantly in our estimate of the situation. It is merely a question of *showing their relations,* of *organizing* them into a body of tested truth.

This process of organizing knowledge, and of formulating and testing the fundamental truths which result from such organization, has been accomplished, or is now being undertaken, in nearly every other human activity. Some activities, like physics, have been quite well explored; others, like sociology and economics, are not yet so well studied out; but even so abstruse a subject as the *learning* phase of psychology has now been organized into a few simple principles—principles so practical that they can even be applied to sculpture, painting, and music, and in so simple a way that even rough soldiers like you and me can understand why a certain work of art pleases and why another does not.[14]

The various human activities in which knowledge has been so organized are known as "sciences"; for science is simply organized knowledge. Some people imagine that only exact studies, like mathematics, are *sciences;* this is an error. Every phase of human knowledge, however exact or inexact,

[14]Spearman, *Creative Mind.*

has the makings of a science in it. To be a science it only requires that the knowledge of the subject be organized.[15]

It becomes clear, then, that the Field Service Regulations is correct in asserting that methods of action in war must be based on certain unchanging principles. The difficulty is to discover these principles.

The "principles" which we are actually using as our stock in trade are not in fact unchanging basic truths such as are referred to in the Field Service Regulations. Rather, they are *very* general guides, subject to application or exception according to circumstances.

Our problem, then, is to organize our facts so that we may deduce true principles, which will serve as the basis of detailed methods to meet each situation.

If our knowledge is organized, then our application of it will be relatively swift, sure, and effective. The application of knowledge, to get practical things done, is *art*. All arts, including even such as painting, house-building, or cooking, rest on science. War is both a science and an art; and, as for any art, we will apply it more effectively as an art if we understand the science underlying it. It is for that reason that we go to service schools—to get knowledge of war, and to organize our knowledge so that we can practice our art more effectively.

That this organization of our knowledge of war into a science is feasible, it is the purpose of our further discussion to prove. It will be a practical and useful work if it enables our officers to make periodic inventories of their professional stores of knowledge, to discard useless items, and to arrange the tools of the mind according to a correct and simple system. Then, and then only, will they be able to utilize these tools promptly and effectively in the practice of their art, almost "as an instinct" (British Field Service Regulations), through the application of the principles of the science of war.

II.—The Practicability of a Science of War

The previous discussion has been concerned with establishing a structure of fact as follows:

First, that our Field Service Regulations[16] informs us that procedure in the field must vary to suit circumstances;

[15]Encyc. Brit., *Science* and *Art;* Fuller, p. 20; Fowler, *Dictionary, Science.* Duff, pp. 1-5.

[16]FSR, 1923, p. III.

but that these variations, to be sound, must be based on the application of certain unchanging principles of war. Also, that the British regulations state, in almost the same terms, that it is by the application of such principles that a soldier applies correct methods in any particular situation almost "as an instinct".

Further, that the existence of such principles and the employment thereof in order to determine correct methods of procedure, are recognized not only by high authority in the military profession, but in all other realms of human activity.

That, notwithstanding the pronouncements of our Field Service Regulations noted above, there is not contained in that publication, or in any other official text, a statement of what these basic principles are, and that such a statement has only appeared in the British Field Service Regulations since the World War; that an enumeration of such principles did appear in our Training Regulations prior to 1928, but has since disappeared therefrom.

That for lack of such principles serious errors of thought are constantly occurring among our officers, and that such errors have been frequent in actual operations of the past.

That instead of presenting principles of the type referred to in Field Service Regulations, our service schools and our official texts present general guides subject to frequent exception.

That these general guides have the defect that they are part-truths, subject to misinterpretation; and that the human tendency is to apply them without variation.

That we can not count on overcoming this ingrained human tendency, because it is in fact characteristic of all forms of life, and is older even than mankind. Nor can we discount it by giving *no* guides, because in such a case human beings will make up their own guides, and usually very imperfect ones.

That, therefore, the only remedy is to provide our officers with invariable basic principles such as are contemplated by the Field Service Regulations: in short, to organize our facts by the formulation of such principles, and thus to build a science of war which will serve as a basis for the practice of the art of war.

That this can be done it is now intended to demonstrate.

Napoleon frequently refers to the principles of war, even naming some of them, as he conceived them: namely, concentration of forces, activity, a firm determination to perish with glory, and, as Vachee adds, the utilization of surprise by strategem, secrecy, and rapidity.[17] Among his maxims of war we also find references to the objective, to unity of forces, and to security.[18] In his correspondence can be traced the influence of factors pertaining to the objective, to use of strength against weakness, to mass, to the offensive, security, surprise, and movement.[19] He vigorously denied that his plans and actions were based on flashes of genius, of inspiration: "We must not be deceived; the improvisation was only apparent. For a certain time past, Napoleon had been pondering over his business, but he said nothing about it to anyone. 'If I appear to be always ready to reply to everything,' he said to Roederer, 'it is because, before undertaking anything, I have meditated for a long time—I have foreseen what might happen. *It is not a spirit which suddenly reveals to me what I have to say or do in a circumstance unexpected by others,—it is reflection, meditation*'."[20]

"Peruse again and again the campaigns of Alexander, Hannibal, Caesar, Gustavus Adolphus, Turenne, Eugene, and Frederick. Model yourself upon them. This is the only means of becoming a Great Captain, and of acquiring the secret of the Art of War. Your own genius will be enlightened and improved by this study, *and you will learn to reject all maxims foreign to the principles of these great commanders.*"[21] There could hardly be a more emphatic statement of the existence of certain basic principles of war, and of the difference existing between such principles and mere "maxims."

Foch also postulated certain "fixed principles of war applied in a variable way," precisely as is contemplated in our Field Service Regulations. He founded his system in general on Clausewitz.[22] His work was obviously incomplete, as is evidenced by his listing of the principles of economy of force, of freedom of action, of free disposal of forces, of security, and, as he ended the list, "*etc.*" A reading of his works indi-

[17]Vachee, pp. 17, 22, 275.
[18]Burnod, Maxims V, LXXVII.
[19]Fuller, p. 13.
[20]Vachee, p. 7.
[21]Burnod, Maxim LXXVIII.
[22]Foch, pp. 13 *et seq.*

cates that he regarded also as principles the offensive, the objective, the unified employment of the mass (greater part) of the force, and security. But it is evident that he made no logical distinction, in fact, between principles and methods. He is said to have demurred when offered Bonnal's vacancy at the Ecole de Guerre, because he was not yet sufficiently sure of his principles. In later years he referred to his book on the Principles of War as a work of faith rather than of reason.[23]

Indeed, it is evident that Foch invalidated his work and confused his own mental processes by that human error: failure to define his terms, as to which Lord Grey is said to have remarked, "Discussion without definition is useless." Foch denies that war can be a science, affirms it as an art, and declares that it must be founded on principles, else it could not be an art.[24]

Here we have that error which is so common among soldiers: a loose use of terms without care to define them, which error leads to so much boresome and time-wasting discussion among military men as to *science* and *art*, and as to the nature of principles.

A recent case in point is General Maurice's discussion of this same subject. He affirms that action tends to be correct in war if correct principles are instinctively applied. He then denies that war is either a science or an art, although affirming that part of it partakes of the nature of one or the other. He declares, with Clausewitz, that it belongs not in the domain of the arts and science, but rather in the sphere of social life. He further states that no leader in the field can ever treat his task as the scientist treats his, because he can never proceed forward from ascertained and proven data. A detailed study of campaigns, he says, will be of no use as providing parallels for imitation, but it *is* of use in that it leads to a study of the conditions which caused a commander to act as he did, and so trains the mind to solve a military problem correctly. Strictly speaking, he continues, the principles now given (1929) in the British Field Service Regulations (concentration, economy of force, surprise, mobility, offensive action, cooperation, security) are methods—

[23]Foch, p. 8. Liddell-Hart, *Foch*, pp. 33 *et seq.*
[24]Foch, pp. 8-9.

not principles. Military terminology, he remarks, has never pretended to be scientifically exact, and the claim that the principles of war are immutable can not be accepted literally.[25]

No better exposure of the fallacy of such loose thinking—based as it is on a loose use of terms—could be written than that by General J.F.C. Fuller.[26] The contrary is so well established in the civilian world that its repetition would be a waste of time were not such fallacies so widespread among soldiers. A reference to the dictionaries, the encyclopedias, or any of the elementary scientific works included in most good military libraries, should serve to correct such gross misconceptions.

These misconceptions are built, first, on the faulty assumption that, to be a science, the activity concerned must be susceptible of reduction to terms of exact measurement. This is incorrect, for science is simply *classified knowledge*,[27] exact or inexact—the more exact, of course (provided that it is still true), the better. There are exact sciences such as mathematics, but there are many inexact sciences, as baffling as war: for example, medicine, psychology, biology, sociology. When Clausewitz and Maurice deny war to be a science, and classify it in "the sphere of social life," they negative themselves; for sociology is certainly a science. Of course, some sciences have been relatively more thoroughly explored than others, but so long as the available data are organized, they are none the less sciences, however inexact. *Science* means, basically, "knowledge." In the modern sense, it means organized knowledge.

Now art (basically, putting or fitting together) means *doing*, the application of knowledge in the realm of practical affairs. Of course the term "art" is often also used loosely to mean the "fine arts"—painting, sculpture, music, literature—which special restrictive meaning causes some confusion.

"The whole discussion may be summed up thus. Science consists in knowing, art in doing."[28]

"Science teaches us to know, an art to do."[29]

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[25]Maurice, pp. 3, 23, 27, 38.
[26]Fuller, p. 20 *et seq.*
[27]Encyc. Brit.; Standard Dictionary; Webster's Dictionary.
[28]Encyc. Brit., 1910, p. 659.
[29]Archbishop Thompson, *Laws of Thought*, p. 10.

"Every art is founded upon science; thus we have the science of electricity and the arts of electric lighting, electroplating, etc., based upon it; the science of astronomy, and the art of navigation dependent upon it; the laws of sound and the art of music . . . There does not appear to be any real supernational basis of any of the arts. Facts, laws, experience form the original source and foundation of all our knowledge, practice, and progress."[30]

"Science . . . organized common sense.—Thomas Huxley."[31]

"Science . . . a department of practical work which depends upon the knowledge and conscious application of principles."[32]

"Science . . . systematized knowledge . . . A science teaches us to know, and an art to do, and all the more perfect sciences lead to the creation of corresponding useful arts. Astronomy is the foundation of the art of navigation; chemistry is the basis of many useful arts."[33]

"Science knows, art does; a science is a body of connected facts, an art is a set of directions; the facts of science are the same for all people, circumstances, and occasions; the directions of art vary with the artist and the task."[34]

Therefore, art is not a supernatural or mystic thing. Napoleon, as we have seen, denied that his art was inspired. On the contrary, art, good or bad, is merely practice: The putting into practice of knowledge. The basis of art is science —organized knowledge. Knowledge is organized by the formulation of laws or principles, which, in the scientific sense, are invariable truths. Based on these principles, knowledge may be put at the service of art, so that the correct methods to be applied in any particular situation may be quickly and accurately worked out.

Whether the British "Principles of War" are in fact immutable, is certainly subject to doubt, as indicated by General Maurice, for they are merely named; they are not precisely formulated. How, then, can they be tested? But it can not be maintained that the British Field Service Regu-

[30]Gore, *The Scientific Basis of Morality*, p. 1.
[31]Liddell Hart, *Science of Infantry Tactics*, flyleaf.
[32]New Oxford English Dictionary.
[33]Webster's Dictionary.
[34]Fowler, *Science*.

lations, and our own, are in error in stating that the effective practice of the art of war depends on the application of unchanging basic principles; for this means, in turn, that the *art* of war, as for any other art, rests on a *science*—the science of war.

War is both a science and an art. In the field of knowledge it is a science. In the field of practice, it is an art.

The high authorities that proclaim the existence of basic and unchanging principles of war, are announcing a truth. What these principles are, seems yet to be found out.

The difficulties that military men have encountered in endeavoring to isolate the principles of war, are due to the fact that they have merely named them, then applied them. They have not formulated them in exact terms. We see this in our old Training Regulations No. 10–5; in General J.F.C. Fuller's *Foundations of the Science of War;* in B.H. Liddell Hart's *Science of Infantry Tactics, Simplified.* The disappearance of our own Principles of War (Training Regulations No. 10–5) may be attributed to the fact that, for lack of formulation in exact and practical form, we could not apply them. There were, moreover, defects of logic in the system, as will eventually be indicated in this study.

The same situation existed a few years ago in psychology. Take the following excerpt from William James' *Psychology, Briefer Course,* 1892, page 468[35]: "A string of raw facts; a little gossip and wrangle about opinions; a little classification and generalization on the mere descriptive level; a strong prejudice that we *have* states of mind, and that our brain conditions them; but not a single law in the sense that physics shows us laws, not a single proposition from which any consequence can causally be deduced. We don't even know the terms between which the elementary laws would obtain if we had them. This is no science; it is only the hope of a science."

Change a few of Mr. James' words to fit the military profession. Change "states of mind" to "principles of tactics and strategy" and change "and that our brain conditions them" to "and that we military experts understand them even if no one else can." Make these few changes, and we have

[35]Spearman, *The Nature of Intelligence and the Principles of Cognition,* p. 29.

the situation in our profession today. It can hardly be said that any other profession would glory in such a situation. A few years ago the industrialists and bankers were inclined to a similar professional mysticism, but they have lost prestige decidedly since 1929. Even the legal profession finds itself on the defensive. Informed opinion nowadays is pretty generally impatient of professional camouflage.

The fact is that *all* activities are both sciences (in the sense that they have the makings of a science in them) and arts, whether they be such elevated professions as government, law, medicine, and diplomacy, or such humble but essential matters as cooking, ditch-digging, or plumbing.

Now a scientific principle—a basic invariable truth—does not say "you ought to do so-and-so." On the contrary, it says, in effect, "if such-and-such is true, so-and-so follows." Or it may say the same thing this way: "The possibility of doing so-and-so depends on this and on that." Then even if this or that has a certain value in one case, but a much different value in the other, the principle is still true. Such principles are based on the fact, sometimes called the Law of Uniformity, that in the world in which we live the same causes always produce the same effects. We can count on that.[36]

All scientific work is based on the Law of Cause and Effect (the Law of Uniformity of Nature), which asserts that the same conditions will always produce the same results, and that there is a harmony of nature such that its laws never vary.[36] If we discover what its laws are and act in conformity to them, we enjoy great advantages; whereas, if we run counter to these laws, we always pay a penalty: the friction of nature reduces our power, hampers our acts, and frustrates our energy.

The characteristic spirit of true science is an utter lack of prejudice, and a willingness to accept the findings of logic irrespective of our personal preferences. This is one of the most valuable (and rare) traits of a human being.[37]

The characteristic method of science is:[38]

[35]Newman, pp. 4-5; Duff, p. 4.
[37]Werner, p. 288.
[38]Spearmen, p. 14 *et seq;* Maxwell, p. 11.

First: to define the field of investigation.

Second: to assemble facts, testing them as such.

Third: to classify the facts and to deduce *laws* (that is, *principles*) which explain the relations among them. The practical virtue of this final step is that it permits predictions as to the future, and saves time and energy which would otherwise be consumed in random tests.[38]

Once the principles have been discovered, any proposed method of action can be tested in the light of the particular principles concerned, and, if faulty, rejected before trial, thus saving lives and battles.[39]

In some cases the state of our knowledge does not permit us to formulate principles as definitely as we would wish. In such cases we have to content ourselves with qualified or provisional statements of tendency, pending the collection and organization of more facts.[40]

There should be no surprise when announced principles are rejected, and others evolved, on the discovery of new facts. This is inevitable. No human being "knows it all."

Any single event is necessarily the compound result of all the applicable principles. For example, a compass tends to point to magnetic north, but it also tends to point toward any magnetic metal near at hand. A person who did not know this latter fact might blithely follow his compass toward the west, thinking that he was going north. Hence, we must have a *complete set* of principles.[41]

It may be that if we act so as to take maximum advantage of the results in applying one principle, we may thereby run counter to another and so incur certain disadvantages. Therefore, in each case, we have to weigh the disadvantages against the advantages and decide how we can get the most of the latter with the fewest of the former. We know that water is wet, and that a sleet storm in cold weather has such effects on our physical system that we may get pneumonia. But we also know that fire burns. Therefore, if the house catches fire, we may prefer to run out into the storm at mid-

[38]Spearmen, p. 14 *et seq;* Maxwell, p. 11.
[39]Duff, pp. 1-5. Jastrow, p. 196.
[40]Duff, p. 3.
[41]Spearman, *Creative Thinking*, pp. 14 *et seq.*

night, though we be very thinly clad, because if we do not we will certainly burn up.

The idea is: we use principles to discover the best mode of action at the time. To gain the tasty fruit of the tree, we may have to endure the results of poison ivy growing on the tree. If the fruit is worth it, we nevertheless go after it, but with open eyes and a clear realization of the risks involved.

The only way to evolve usable correct guides is through the scientific method, which results in certain principles which are simple and invariable. There will still be need of thorough military education and training, because the application of these principles (the evolving of correct methods for applying them) will, at the best, still leave plenty of room for mistakes. But at least we will not have *invited errors*, by setting up a number of faulty guides, subject to exception, which human beings, especially under strain, will always tend to apply as if they were invariable, when in fact they are not.

To organize our knowledge of war, then, and to deduce its principles, we must:[41]

> Determine what war is.
>
> Assemble our data as to war, tracing its various activities down to the simplest and most self-evident facts.
>
> Ascertain the relations between these facts. The result should be a number of statements of invariable and fundamental truth (that is, principles).
>
> Test these principles to see that they are ultimate, and are not deducible in turn from others more general. (The word principle is from Latin *principium*, meaning a "beginning.")
>
> Test the whole series of laws to see that they are a complete set.

In attempting such a classification, we must always first *define our terms*, then assemble our facts, then test them, then classify them, and then search for the unifying principles. Having found these principles, we must constantly strive by wider study to obtain an even more general principle (still without exception) which may replace several principles of a lower order; thus we simplify the organization of our knowledge.

[41]Spearman, *Creative Thinking*, pp. 14 *et seq.*

In the next stage of our study, we will apply this method of study to war, in the effort to justify the statement in the Field Service Regulations that there are in fact certain basic and unchanging principles of war, by applying which we may deduce correct methods to meet specific situations arising in war.

III.—A Suggested Science of War

In our previous discussions we have endeavored to establish certain facts:

That our Field Service Regulations[42] announce that war is governed by certain basic unchanging principles, whereby a soldier, faced with a specific situation, may deduce sound methods for dealing therewith. That these principles, however, are nowhere in our publications actually stated; that they are not taught in our service schools; and that there is great confusion of thought as to what they in fact are.

That, moreover, Great Captains of the past have referred to such principles; but that there is evident confusion of thought among them, also, as to what the principles are, both in nature and in fact.

But: that modern science and the progress of our civilization are founded on the existence of principles of the same nature as those described in our Field Service Regulations, which fact proves that the Regulations are indisputably correct. That all human activities consist of two aspects: organized knowledge (which is a *science*), and the practice or application of that knowledge (which is an *art*). That art rests upon science, and that the organized knowledge of science can be, and is, made to serve as a means for more effective practice of art.

We have seen that the procedure to follow in forming any science is to assemble our facts, to test them and define them, to determine their relations with each other, and to state these relations in the simplest correct terms; and that these statements, if correct, basic, and invariable, will then be principles. That unless these principles are statements of invariable truth (without exception) and basic to the subject, they will constitute mere guides subject to exception (that is, methods or procedures, rather than principles); and that

[42]FSR, 1923, p. III.

such faulty guides, owing to the inescapable tendencies of human nature, will be treated as invariable, and will therefore invite error.

It is proposed in this portion of our study to evolve a practical, useful, simple, and correct science of war.

What are the basic factors of war?

One way of arriving at these, is to determine what the thoughts of Great Commanders may have been on this subject. Napoleon has left us a clear indication of the facts which "influenced the variety of his dispositions":[43]

1. The number of troops (infantry, cavalry, artillery, etc.) composing the force.
2. The relation existing between the opposing forces and their moral faculties.
3. The object in view.
4. The nature of the battlefield.
5. The position occupied by the enemy, and the character of the leader in command.

These basic factors which influenced Napoleon resemble so much our own estimate of the situation as to raise the question whether we can not find in the outline for that estimate the basic factors of war. Let us try it[44], and list the factors so obtained.

First, we find the mission. Next, the elements of relative combat strength: numbers, physical condition, morale, training, composition, supply, equipment, neighboring troops. Then, under each possible plan open to either side, come factors of relative combat strength (as above), the time element, the weather, the terrain, and the condition of routes of movement as to troops, evacuation, and supply. Additional factors noted are the attitude of the enemy, his past action, the characteristics of his commander, and his probable knowledge of our situation. In connection with each plan, we also ask ourselves:[45] If successful, will it facilitate carrying out the mission? Also, will it favor probable future action of our own force and supporting troops? (These two questions can be briefed to one: Will it have the desired effect?) Finally, considering time, space, and terrain, and all factors pertaining

[43]Vachee, p. 276.
[44]Staff Officers' Field Manual, Part One, p. 45.
[45]An Abbreviated form for an Estimate of the Situation, C & GSS, 1934.

to relative combat strength, has it a reasonable chance of success? (In short, do we have adequate means available?) To these questions, one more may well be added, which is frequently applied as a test for each plan: What will be the result of failure?

Are these factors all truly basic? There are some items which may be in doubt, and the list can probably be simplified. If the reader will look at the Figure 1 (page 124), he will see listed in the right (last) column, the factors as given in the estimate form. In the next column to the left (next to last) he will see a simplified list.

The simplifications, aside from some rearrangements, are as follows: The "effect desired" covers the mission; so the mission is included with it, and does not appear separately. We will simplify the list also by leaving out "neighboring troops," applying the factors to all our troops and all the hostile troops in the picture. Time is not basic; it is the result of the factor *capabilities of movement* divided by *distance* plus *obstacles* plus *weather*. We will include direction, which also pertains to movement; *observation*, which depends on terrain and on special facilities such as balloons and airplanes; *visibility*, which is a factor under time (of day) and weather; and *cover*, which is a terrain factor, a weather factor, and a time (of day) factor. We will insert *vulnerability* (the opposite to cover). Then, having disposed of weather under so many other headings, we will omit it. We must add signal communication (which can not be taken for granted). Finally, we must put in moral factors (including the characteristics of the commanders and troops, enemy habits and past action, surprise, and many other items which we usually cover by the terms "morale" or "moral factors").

There will be many disagreements as to how to shape up this list; and a highly critical investigation of it (and of the form for an estimate of the situation) is certainly in order, as here lies the germ of the science of war, and the secret of accurate estimates of the conditions of war.

Now, the next thing to do is to discover how these basic factors are related to each other.

If they were all of the same category, it would be easy; we could relate them in terms of *each other*. For example, if they each represented so many individual things, whether

men, houses, pins, or what not, this would be easy. But, since we can not express their relationships in terms of each other, we must do it in terms of something else. If they all had physical weight, we could express their relationships in pounds. If they all had a commercial common denominator (whether they were meat, whisky, ships, or real estate), we could relate them in terms of purchasing value, giving each a rating in dollars. What *is* their common denominator?

It is not men, it is not animals, it is not vehicles, it is not tons, time, or horse-power! No, but it *is* a form of *power; it is combat power.*

Every factor in the list has a relation to combat power: *what* its intensity is, *where* to use it, *when* to use it, *how* to use it, or *why* to use it.

Now we must endeavor to work out a way of classifying these factors with reference to combat power.

To do this, we had (first) better step back out of the restricted realm of war, and take a wide view of *all* human activity.

Whenever a human being gets a job to do, he finds that it has three main elements:

The *objective* (result) to be attained.

The *means* available.

The method of *control* to use the means to attain the objective.

Usually the means (whether money or personnel or tools, or all of these) are limited; thus the real problem is *how to control the means so as to accomplish the objective with least waste of effort.* Our essential problem is always to get:[46]

Unity
of effort
through the
Control
of the
Means
in order to attain the
Objective.

This is true of any form of human activity; therefore it is true of war. Now, to analyze war, we must determine

[46]Interparliamentary Union, v.Metzch, p. 45; Liddell Hart, *Sherman* p. 421; Fiske, pp. 95, 365.

what it is, *why* it is (its purpose), *where* and *when* it occurs (its environment), and *how* it is conducted (with what means).

War is a contest, primarily by physical force, between political bodies.[47] The purpose of war is to change an existing condition, or to maintain it—in other words, to enforce a policy. Therefore, if wisely directed, war is undertaken with the purpose of effecting the desired change (or preventing it), with the least detriment to the peace, with justice, security, and prosperity, which ought to follow the war. Consequently, if wisdom rules, war is resorted to only when it is necessary to change a condition or to resist such change, and when this can not be accomplished by the means available in peacetime. War is resorted to when peace fails. Diplomacy utilizes argument and persuasion: that is, *mental* and *emotional* force; when these fail, if the existing condition (or the possible change therein) can not be tolerated, resort is had to *physical* force, though of course all other forms of force are also utilized.[48]

The final objective, then, of any war is to break the enemy's will to resist. War is a contest of wills. The true objective is the enemy's will (his government; command system). When its resistance is shattered, the rest amounts to mopping up.

Since war is primarily characterized by physical force, but utilizes all forms of force (whether mental, emotional, or physical), its sources of energy must be certain means which have the capability of developing force for military purposes: that is, which have *combat power*. This combat power is of various kinds. The sources include men, and the animal and mechanical agents which they control, and the powers of nature which men utilize or which influence them. The kind of combat power depends upon the capabilities of the source. The relations are shown on the next page.

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[47]Fiske, p. 357.

[48]Interparliamentary Union: v.Metzch, pp. 31-32; Fuller, p. 52; Bratt & Sergel, p. 78. Liddell Hart, *Sherman*, p. 421.

Sources		*Kinds of combat power*	
Men		Mental Emotional Muscular	Mental
Animals	Controlled by Men	Emotional Muscular	Emotional
Mechanical agents	Controlled by Men	Mechanical	Physical
Powers of Nature: Utilized by men		Natural	Muscular Mechanical Natural

These are the *means* of combat power. They make up a considerable list of items, and it is highly desirable, if practicable, to simplify the classification. This can be done. These sources of combat power have certain definite characteristics which determine their methods of action. If we reduce the operations of war to their simplest terms, we find that any given element of combat power, whether an individual or a large force, performs the following acts:

"Fending," which implies a constant posture *on guard;* for if his guard is not effective, for example, the boxer may get no opportunity to deal his blow; the bayonet-man may not be able to deliver his thrust.

"Finding" the opponent.

"Fixing" (holding, pinning) the opponent, when found: that is, restricting his power to move, so that he may be "set up" as a target for the decisive blow.

"Fighting" (striking) the opponent, which implies putting a blow through or past his guard at a vital spot.

"Following" the opponent.

"Finishing" him.

These elementary tactical acts involve capabilities of:

Protecting
Moving
Hitting and holding (that is, producing a certain *intensity of combat power*).

Any given element (unit or weapon) will therefore have certain characteristics as to:

Security
Movement
Mass (which, as used herein, means intensity of combat power)

You see this clearly in a warship or a fleet. It consists of so many guns (*combat power*) on *moving* platforms, which guns are *protected* by their own powers, by their ability to move, and by armor. You see the same thing in the tank, which is defined by the War Department as a track-laying vehicle combining *fire-power and shock-power*, cross-country *maneuverability*, and *protection* for its crew.[49]

Mass, movement, and security represent the essential characteristics of combat power. No matter how the forms of combat power may change, they can always be expressed in terms of these factors. Mass, movement, and security, then, are the *means* whereby war is waged.

If, then, as we have said, the basic problem of any human task is *how to obtain unity in the control of the means in order to attain the objective*, the basic problem of war is to obtain:

Unity
in the application of combat power
through the
Control
of the
Movement
of
Secure
Mass
to attain an
Objective.

The basic process of war on land, on the sea, or in the air, is to *move* our *combat power* by *protected* routes, under *control;* to such locations (*objectives*), as will enable us to get the best results from it. Admiral Fiske puts it that "the effort of each is to dispose our force so toward the enemy's that we can use our weapons better than he can his."[50]

To utilize our means (sources of combat power), we must be able to put them in the proper place (the *objective*) by *moving* them; we must be able to *protect* them and to *control* their *intensity* (mass). We must determine:

The *objective* where we wish to place our combat power, and the manner in which we wish to dispose it there, either to hold the objective for ourselves or to deny it to the enemy.

[49]Fiske, p. 57; Infantry Field Manual, Vol. II, Tank Units.
[50]Fiske, p. 366.

The *movement* of our combat power toward the objective.

The *protection* of our combat power.

The disposition of our combat power to produce the intensity (*mass*) desired.

The *control* of our combat power.

The aim of the commander should be so to control the movement of protected combat power, as to place it in a location where the maximum results may be accomplished with a minimum expenditure of force. Another way of stating this is that the controller (commander) should endeavor to place his protected mass in such a location relative to the enemy, as will insure success without fighting; but if this is impracticable, such a location that the fight which follows will insure success.[51]

If we now list our results in Figure 1 (page 124), reading from left to right, we will list the "elements of any task" in the first column, and the "elements of war" in the second. In the third column, *we will organize our basic factors* under the headings so established, and the result should be to show us what factors influence the employment of our *combat power:* the purpose of such employment, what means of combat power are available, and when and where to employ them, and how to control such employment.

We should be able to agree that the *objective* we set ourselves in any particular case depends on the *effect we want to produce.* It varies with the situation. It always involves reducing the hostile will to resist. It does not always require *destruction* of this will. That, again, is a matter of degree and depends on the situation.[52] In other words, will the plan involving this objective, if successful, facilitate accomplishing the mission, and further the action of supporting troops?

And surely we must consider whether we have adequate means (that is, has the plan a reasonable chance of success?). Do we have the *mass* (intensity of combat power), the capabilities of *movement,* the innate *security* necessary to carry out this plan?

Every one admitted the fine effects which would be produced during the World War by capturing Constantinople

[51]Encyc. Brit., *Strategy;* Fiske, p. 366; Pakenham-Walsh, p. 127.

[52]Interparliamentary Union: v.Metzch, pp. 31-32; Fuller, p. 52; Bratt & Sergel, p. 78.

for the Allies; but the people who objected raised the questions: Where will we get the combat power? Can we move it there in time? Will we be secure in France if we transfer enough power to Gallipoli?[53]

Another example may be taken from the period preceding the German offensive of March, 1918. Field Marshal Haig told the British War Cabinet in the spring of 1918 that Ludendorff had better think twice about attacking, for if his offensive failed he would be in a critical situation.[54] And, as we know, it did fail; and he was.

The word *mass* has many meanings. It no longer implies numbers only; and has come to be used in the sense of relatively great concentrations of power.[55] Hence we use it here to mean *intensity* of combat power. It is certainly true that *the effect of our mass depends on the mass in opposition.* If the enemy's combat power is less than ours, we will get better effect. If we can, we prefer to find out where he is weak, and go after him there. *But we can not always do this!* Why? Because we do not always know where hostile weakness is; and even if we do find out, a push there may not lead us toward our *objective;* or if it does, it may be that *movement* in that direction is too difficult for our artillery and tanks; or that such movement may jeopardize our *security;* or that we can not *control* our means well in that locality, because we do not have good command and artillery observation to insure coordination of the infantry-artillery team. So *hitting weakness is a method, not a principle.* Sometimes we have to hit the enemy where he is strong; and the commander who does not appreciate this, and who thinks he should *always wait* till he finds weakness to attack, or, having found it, should *always* attack through it, may involve himself in serious difficulty.

Another fact as to *mass* is that *it consists of fire-power and shock-power;* they are its components. As we have said, it is not numbers alone that count; it is *power.* There are many subordinate elements that go to make up this effective fire-power and shock-power, such as morale, physical condition, and training, and others which we have shown in our list.

It is also a fact that *mass depends on security.* We must

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[53]Robertson, Vol. I, pp. 83, 88, 118; Vol. II, p. 110.
[54]Robertson, Vol. I, p. 320.
[55]Interparliamentary Union: Delaisi, p. 180. Maurice, p. 113.

be secure, at least to a degree, before we can act. If our guard is defective, the enemy may get in a disabling blow before we can land our own punch.

Movement, of course, has direction and speed. Its *direction* is tied in closely with the *objective*, for that is what we move on. *The effect of movement depends on its objective and on the practicability of arriving there;* for it must be directed at an objective of some value, or the enemy will not be influenced by the movement; and if it can not arrive at the objective, no matter how critical the latter is, the enemy will laugh at it. Therefore *movement depends on its objective, on physical capabilities, and on mass, security, and conditions of nature,* including distance, obstacles, and visibility. The obstacles may be imposed by terrain, climate, or weather.

Security depends on mass (including neighboring and supporting troops) just as mass depends on security; it also depends on the vulnerability of the man, beast, weapon, or vehicle; on distance; and on cover (obstacles and visibility).

The test of *control* is unity of effort. That is the purpose of any control system. Control obviously depends on the various factors listed after unity, in the figure.

Now the question will be asked: Where are the principles? The basic principles of war, as described in the Field Service Regulations, are now before our eyes. It is immaterial what we call them. We may call them the Principle of the Objective (of Combat Power), of Mass (Intensity) (of Combat Power), of Movement (of Combat Power), of Security (of Combat Power), and of Control (of Combat Power). Or, under each heading we may set up several separate principles instead of one compound one. Or we need not *name* them at all. But we must formulate them definitely in words, and understand them clearly, in order to use them.

So far as stating them goes, that is now easy. We will not state them all here; the reader can do it for himself. We can say that the suitability of an objective *depends on* the effect desired; or we can say that it *varies with* the effect desired. It also varies with the probable results of failure to attain it or to hold it, and with the means available.

The effects of mass vary inversely with the mass in opposition; directly with the fire-power and shock-power available; directly with security.

The effectiveness of movement varies with its objective; directly with our own mass; inversely with that in opposition; directly with capabilities as to speed and obstacle-crossing ability; and so on (see Figure 1, page 124).

The reader can supply the rest for himself, except that it may be well to state here the principle of unity (under control): *The effect of control varies with the degree of unity existing among the efforts of component elements.*

Now, the reader should apply to these principles the following tests:

> Are they fundamental to war (remembering that the characteristic feature of war is *combat power*)?
>
> Are they invariable? If any of them admits of a single exception, it is faulty.
>
> Are they, taken together, a complete set?

We have seen that a scientific principle is a fundamental and invariable truth. We have worked out the principles which constitute the fundamentals of war.

The importance of evolving for our professional use a set of correct, simple, practical basic principles of war can hardly be exaggerated at this time. We live in a critical transitory stage. Great wars seem to loom on the horizon—wars perhaps much different, as to forms and appearance, from our last war. Every nation that can afford to do so is motorizing and mechanizing. The War Department has particularly urged this on our own government. Dr. Herbert Adams Gibbons, distinguished political scientist, recently remarked that in the next five years or so, armies, generally, will radically change in appearance.

If armies change we need have no fear that we shall be at sea as to how to act, provided we have organized our professional knowledge in terms that never change. But our actions must be based on simple principles, invariably true, which will govern in any case. We must not make the mistake of adopting a number of particular methods, and of calling them principles. Such procedure would be a grave error, because the conditions justifying the method may

change, in which case the method must be changed. If we try to apply such a method as an inflexible rule, we may fall into serious error.

Not only is this true, but, as we have noted was the case in the World War, it has become necessary for soldiers to be able to explain themselves to the civil government. In this connection, in our previous discussion, we have noted the experiences of Sir William Robertson, the British Chief of Staff. We may add that Sir Henry Wilson, who succeeded Robertson, quickly established his competency before the cabinet by his ability to explain his views.[56] The necessity of such capabilities in a soldier was of course also emphasized in our Civil War. If our knowledge is not organized, it is difficult to explain ourselves.

Moreover, while it is true that exercise of knowledge may be either conscious or intuitive, nevertheless, for most of us, our art is most effective if we are definitely conscious of why we wish to do what we do.

It may be that the organization of knowledge given here is in error. If so, all the more reason for rectifying it and establishing a correct one. The alternative is to be content with general guides subject to exception—that is, with methods. And such methods have the defect pointed out in Field Service Regulations. Such guides are not complete; they are not the whole truth. They are at best only an indication of certain methods which may or may not work in a given situation. And to adopt the narrow view that a certain method is *always* applicable without exception; to insist that such a part-truth is the whole-truth—such an attitude substitutes dogma for reason, and, by mistaking a method for a principle, incurs the certain danger of grave errors.

This is what is meant (or what really should be meant) when we are warned against "paralleling." Actually, there are different forms of paralleling. All human thinking is based on paralleling; on correct paralleling and incorrect paralleling. Given two facts, we can deduce a relation. Given a fact and a relation, we can then deduce another fact. This deduction is based on our experience in like cases.[57] The point is that incorrect paralleling is based on *superficial* resem-

[56]Churchill, p. 747.
[57]Spearman, pp. 24-28; Jastrow, p. 26.

blances. Sound paralleling is based on those invariable fundamentals which are always to be found under the variety of superficial details. It is because human beings *must* parallel that it is important to deduce these basic factors, and to express them as true principles, so that we may have a sound basis for deciding in each case on the method which will best fit the situation. A single factor with a changed value, as of means available, time, muscular or mechanical capabilities, topography, weather, morale, etc., may render a given situation so different from another, in fact, though not in superficial appearance, as to call for a totally different method of action. Hence, each situation must be judged on its merits in the light of these principles of war.

Some years ago, as has been stated in this discussion, the War Department promulgated certain "Principles of War." They were merely named (the least important aspect of a principle); they were not defined, described, or illustrated. There was general ignorance as to how to apply them practically; and since their practical application was not clear, their usefulness was not demonstrated. After some years they disappeared from Training Regulations.

Later it was announced that the War Department was getting out a new set of such principles (though they have not appeared as yet). Then there was much quiet fun about the War Department changing the "*immutable* Principles of War." As a matter of fact, aside from a play on words, it is not funny. You have only to search the history of physics, astronomy, and what not, to find the débris of old hypotheses once regarded as principles, but since discarded and modified as organization of knowledge improved. No set of principles is the last word, because human beings are not infallible. But each set, honestly built up and dispassionately tested by practical work, will undoubtedly push us farther along in the knowledge of war, the science, and therefore in the practice of war, the art.

No matter how conditions may change, war will always remain a contest by force between political bodies. It will always involve the reduction of the hostile will to resist. And while every means of mental power and emotional power, including diplomacy and propaganda, will be invoked, the decision will usually lie in the effective use of muscular and

mechanical combat power. War will always involve the endeavor to obtain unity in the application of force through the control of the movement of protected mass to attain an objective. No matter how armies may change—and they may change radically—there will always be objectives to be accomplished through the control of certain means. The means may undergo great transformations. Infantry, cavalry, and artillery in their present forms may even entirely disappear, but there will still be *combat power* which must be *controlled* in order to attain *objectives*. And the characteristics of combat power will still be expressed in terms of *mass*, *movement*, and *security*.

In the remainder of our study, we will apply these principles of war practically in a definite situation.

FIGURE 1.—FUNDAMENTALS OF WAR

Read in the following order: columns 5, 4, 1, 2, and 3.

OUTLINE OF PRINCIPLES OF WAR				
1	2	3	4	5
Elements of any task	*Elements of War (Considerations influencing the employment of combat power)*	*Arrangement of Basic Factors*	*Basic Factors (A simplified list)*	*Factors in "Estimate" form*
Objective	Objective	Effect desired	Effect desired	Mission
		Results of failure	Results of failure	Effect desired
		Means: Mass	Means available	Means available
		Means: Movement		Result of failure
		Means: Security		
Means	Mass	Mass in opposition	Numbers	Numbers and Composition
		Fire-power and shock-power (including supply)	Composition	Equipment
		Security	Equipment	Physical condition
			Physical condition	Morale
	Movement	Objective (direction)	Training	Training
		Mass (own and enemy's, including neighboring and supporting troops)	Supply	Supply
		Physical capabilities (muscular and mechanical): Speed	Capabilities of movement	Neighboring troops
		Physical capabilities (muscular and mechanical): Obstacle-crossing		Time
		Physical capabilities (muscular and mechanical): Supply		Weather
		Security	Distance	Terrain
		Conditions of nature: Distance	Obstacles	Routes of movement
		Conditions of nature: Obstacles		
		Conditions of nature: Visibility		
	Security	Mass (own and enemy's, including neighboring and supporting troops)		Attitude of the enemy
		Vulnerability (human, animal, mechanical)	Observation	Past action of enemy
		Conditions of nature: Distance	Visibility	Enemy commander
		Conditions of nature: Cover: From fire		Enemy knowledge of our situation
		Conditions of nature: Cover: From observation (secrecy)	Signal communications	

Control	Control	Unity (of effort) Signal communication Physical capabilities (muscular and mechanical) Psychological condition (training and morale) (Surprise and all other moral factors) Mass (as above) Conditions of nature: Distance, Obstacles, Visibility	Moral factors (Characteristics of the commanders and troops) (Enemy habits) (Enemy knowledge of our situation; surprise, etc.)	

IV.—An Application of the Principles of War

In our previous discussion, we have established certain facts; namely: That our Field Service Regulations[58] distinguishes between certain unchanging basic principles of war applicable to all situations, and the changing methods which are applicable to particular situations. That other high military authorities also make this distinction, in *theory*. That in civilian activities this distinction is made in *fact*, and it is realized that effective action is based on organized knowledge, made readily available: that action is *art*, while organized knowledge is *science;* that sound action is furthered by an organization of knowledge; that science should underlie art.

We have seen that knowledge is organized by the formulation of unchanging, basic principles; that the scientific definition of a "principle" is an invariable basic truth.

We have been unable to find such principles in military literature; instead, we have found only general guides, subject to exception, which are in fact suggestions as to procedure, and therefore methods, not principles.

We have seen that such guides, being part-truths, lead to error, because it is an innate human tendency to apply them as if they were always true, when in fact they are not. And we have noted that this human tendency is accentuated when under strain, and that strain is normal in war.

Accordingly, we have endeavored to fulfill the promise of Field Service Regulations; and we have worked out a science of war. Our method was to assemble the basic factors of war as found in our "estimate of the situation," and to relate them to each other in terms of combat power, which is the distinguishing characteristic of war as contrasted to peace. We have grouped these factors into certain principles of war, relating them to each other by relating them to the elements of war: the objective, mass, movement, security, and control. The relations are shown in the modified form for the estimate of the situation (page 129). The principles may readily be expressed by reference to the form. For example: *The suitability of an objective varies with the effect desired, the probable results of failure, and the means available.*

[58]FSR, 1923, p. III.

We will now proceed to apply these principles to a definite problem. This is a standard map problem,[59] prepared with all usual care, but, as given here, considerably condensed.

The reader may sit back in his chair and follow the problem comfortably on the Special Map herewith; or he can solve it as he goes along; or he can obtain the standard maps[60] and solve it thereon.

SITUATION.—*a. Maps.*—Special Map herewith.

b. The Blue 1st Division, Major General A commanding, with the following attached: a balloon squadron, observation squadron, reinforced cavalry squadron, an antiaircraft artillery detachment, a portée artillery regiment, a chemical company, a general-service engineer regiment (plus a battalion), two separate engineer battalions, and four light-ponton companies, is in concealed bivouacs at 9:00 AM, 9 January, as shown on the map.

c. Its mission is to force a crossing of the Monocacy River and Rock Creek between Double Pipe Creek and Gettysburg, in order to cover the crossing of the I Corps and facilitate its rapid advance on Baltimore (about 40 miles southeast of Gettysburg).

d. The I Corps, advancing from the Cumberland Valley (west of South Mountain), will have its leading elements on a north-south line through Emmitsburg at daylight, 12 January. Corps aviation is reconnoitering east of the general line: Westminster—Hanover (about 15 miles east of the Monocacy).

e. Red troops, which advanced from the east, are disposed as shown on the map. The Red groups near the river line include machine guns; north of Harney these groups consist of cavalry patrols and small detachments. Enemy observation aviation is active. No Red combat aviation has appeared.

f. All crossings of the Monocacy River and Rock Creek have been destroyed. No Blue patrols have been able to cross the water.

g. The Monocacy River, Rock Creek, Double Pipe Creek, and Big Pipe Creek to the mouth of Meadows Branch, are

[59] Map Problem No. 7—Series II, C & GSS, 1933-34.

[60] General Map, Gettysburg (1925), 1 inch = 5 miles; Special Map No. 10—Army Extension Courses, C & GSS.

unfordable. All other streams are fordable. South of Double Pipe Creek the Monocacy is 1200 feet wide; north thereof to Piney Creek it is 900 feet wide; north of that point to Marsh Creek, 450; north of that point 300. Depth varies from 8 to 15 feet; current is about 3 miles per hour.

h. The weather is clear and cool. Daylight is at 6:30 AM. Dark is at 6:05 PM. The wind is light and variable. Roads are hard and in good condition.

REQUIREMENT.—The decision of Major General A at 9:00 AM on 9 January.

NOTES

a. Ferrying and bridging.

(1) One light-ponton company, of 36 ponton boats, will ferry a battalion in one trip, requiring one general-service battalion or four combat engineer companies as crews.

(2) A round-trip across the river, including loading and unloading, will take about a half-hour.

(3) A light-ponton company, utilized as double-ponton ferries, can carry one-fifth of an artillery battalion in one load. Such ferries can also carry tanks, one tank to a double ponton.

(4) Bridge approaches on both banks for not more than 100 yards on each bank can be built by one separate engineer battalion without delaying bridge construction. For approaches of greater length, allow one additional separate battalion and a delay of 24 hours for each additional half-mile.

(5) The material of one light-ponton company will construct about 650 feet of bridge, which will carry all division loads except loaded 5-ton trucks (there are few of these). Ponton-company personnel is sufficient only to care for ponton equipment and provide bridge-guards. Construction must be done by general-service or combat engineers; 1½ companies of combat engineers, or 1 general-service company, can construct a bridge at the rate of 200 feet per hour if working from one end; at 400 if working from both ends.

b. Form for estimate of the situation.

1. *Mission.*—The thing aimed at; the result to be accomplished. State it here as received from higher authority, or as deduced from that source.

2. *Opposing forces.*

NOTE.—Consider, under *a* and *b*, all factors shown in the outline under paragraph 3, below, and state a conclusion, under *c*, as to relative combat strength.

a. Enemy forces.

b. Own forces.

c. Relative combat strength.

3. *Enemy situation.*

NOTE.—Based on your conclusion as to relative combat strength, list those plans open to the enemy which may adversely influence your own operations, and test each by the following considerations:

PRINCIPLES OF WAR

Elements of War (considerations influencing the employment of combat power)	*Basic Factors* (organized with reference to the elements of war)
Objective (the thing aimed at; result to be accomplished; a mission in the mind and a location in space) *depends on* (*or varies with*):	Effect desired Results of failure Means available: Mass; Movement; Security
Mass (intensity of combat power) (include neighboring and supporting troops) *depends on* (*or varies with*):	Mass in opposition Fire-power: Number of active sources; Rate of fire; Accuracy; Range and trajectory; Disabling power Shock-power: Number of active sources; Direction; Momentum Security
Movement (change of location) *depends on* (*or varies with*):	Objective (direction) Mass (own and enemy's, including neighboring and supporting troops) Physical capabilities: Speed; Obstacle-crossing; Supply Security Conditions of nature: Distance; Obstacles; Visibility
Security (protection) *depends on* (*or varies with*):	Mass (as above) Vulnerability (human, animal, mechanical) Conditions of nature: Distance: From fire; Cover: From observation (secrecy)

Control (regulation: of all physical and moral factors; includes everything influencing physical and moral stability) *depends on* (*or varies with*):	Unity of effort		
	Signal communication		
	Physical capabilities		
	Psychological condition	Training	Surprise and all other moral factors*
		Morale	
	Enemy mass (as above)		
	Conditions of nature	Distance	
		Obstacles	
		Visibility	

a. Plans open to the enemy.—State them.

b. Analyses of enemy plans.—Test each plan by the outline given above.

c. Conclusion as to enemy action.—Weigh the plans open to the enemy, to determine which has for him most advantages and fewest disadvantages. Give a definite conclusion according to *a*, *b*, or *c*, below, remembering that the conclusion is to be tested by two things: first and most important, *correctness;* second, *definiteness.*

a. The enemy's intentions, if these can be deduced.

b. The capabilities of the enemy (the several lines of action or plans open to him), including a priority of probability.

c. The capabilities, without a priority.

4. *Own situation.*

NOTE.—List all plans open to you in view of your mission and the existing situation. Test each by the considerations listed in paragraph 3, above.

a. Plans open to you.—State them.

b. Analyses of plans open to you.—Test each plan by the outline given in paragraph 3 above. Weigh the plans to determine which has for you the greatest advantages and fewest disadvantages.

5. *Decision.*—State the plan to be adopted, briefly and clearly, including only the following vital elements applicable to the command as a whole: What is to be done; when, where, and how it is to be done; and why it is to be done.

A SOLUTION

The decision of Major General A is as follows (see at end of discussion below; it is suggested that the reader defer

*This includes the present attitude and past actions of the troops involved; the characteristics of commander and troops; and the knowledge either side may have of the other.

looking at the decision until he has gone through the discussion).

DISCUSSION

The decision is reached as a result of an estimate of the situation. A modified form for the estimate was furnished with the problem. It is now proposed to give a brief estimate of this situation, applying the principles, as indicated in the form for the estimate.

1. *Mission.*—To force a crossing of the Monocacy River —Rock Creek between Double Pipe Creek and Gettysburg, in order to cover the crossing of the I Corps and facilitate its rapid advance on Baltimore.

Here we make a mental note that the leading elements of the corps will be up near the river by daylight 12 January; it is desirable that we be established across the river by that time.

2. *Opposing forces.*

a. Enemy forces.—The known hostile forces in our front aggregate an infantry regiment plus a battalion plus certain detachments near the river bank; some artillery of unknown strength; and a cavalry regiment. This force is probably, then, not less than a reinforced infantry brigade and a cavalry regiment. It may be more. It may be reinforced later. It can be rapidly reinforced by motor even from Baltimore. There being nothing known to the contrary, we had better assume its physical and moral capabilities to be excellent.

b. Own forces.—We have our division (twelve infantry battalions organized into four regiments and two brigades), a tank company of three platoons (15 active tanks plus 9 reserve), two light (75-mm.) horse-drawn gun regiments of artillery (four battalions), one medium regiment (155-mm. howitzers, tractor-drawn), one combat engineer regiment (two battalions, six companies), and a signal company. In addition we have a portée 75-mm. gun regiment (two battalions), a chemical company (two platoons, eight mortars: enough to smoke about 2000 yards of front), a balloon squadron, an observation squadron (ten active airplanes), enough light pontons to ferry four infantry battalions simultaneously, enough general-service engineers to furnish crews for three of the light-ponton companies (the balance needed is four of

our combat-engineer companies), and two separate engineer battalions (labor troops), which latter will be needed to construct bridge approaches. If we start bridge construction simultaneously with ferrying, it will reduce our ferrying capacity, as the bridges must be built of the pontons. We have enough pontons to construct about 2600 feet of bridge. Normal road-work can be neglected for a while, as roads are hard and in good condition.

c. Relative combat strength.—At the most we are about twice the enemy's strength in infantry, three times in artillery, and one-third in cavalry. We do not know whether he has tanks. A rough estimate would put our superiority at about two to one; it may be less. We are well equipped, technically, to force a crossing.

3. *Enemy situation.*

a. Plans open to the enemy.

(1) To withdraw

(2) To attack

(3) To hold the river line, either holding the river bank in force, or holding it lightly and retaining large mobile reserves well back from the river.

b. Analyses of enemy plans.

(1) *Withdrawal.*—Very helpful to us. Must not count on it. Must watch out for it, however, as if it occurs and we do not realize that fact, we may lose valuable time.

(2) *Attack.*—While the odds are against a Red attack, we can not dismiss the possibility. The enemy advanced from the east. He may be stronger than half our strength. He may be reinforced later. On the other hand, he has destroyed the crossings. If we move our artillery and pontons well forward initially ahead of the infantry without adequate covering forces, Red might raid us and do considerable damage. We must take precautions. However, we must not let the possibility deter us from attacking.

(3) *Defense.*—On our front of about 30,000 yards (18 miles) it would indeed be unwise of the enemy to attempt to hold the river bank with a large part of his force. Our principles show plainly why this is so.

For example, *his objective* (to hold the river) *varies with the effect desired,* which is to keep us west of the river, or, if we cross, to ruin us while we are astride the river; to ruin us

he would require comparatively large reserves as striking forces for counterattack. *His objective varies also with the results of failure;* if we get an effective lodgement on the east bank, he will lose the value of the river as an obstacle, and his strength, relative to ours, will be much decreased, because we will find it easier thereafter to get at him. *His objective also varies with the means available.* It is simply impossible to hold the river bank in force everywhere with the means at Red's disposal. More of this later.

The effect of mass varies with the mass in opposition. If Red spreads out his combat power along the bank, we can concentrate ours and pierce his front. Such a defense is no stronger than its weakest link.

Movement varies with its direction; with mass; with capabilities as to speed, obstacle-crossing, supply; with security, distance, obstacles, and visibility. If Red's forces are held well forward, it will be difficult for him to shift them to meet us, and particularly to give them such a direction as will be most disadvantageous to us. There are no obstacles east of the river which force him to keep his reserves well forward. For lack of combat aviation, we can retard their movement at long range only by artillery. The road-net is good on the Red side; there is good cover. Everything as to movement favors a defense with strong reserves well back from the river.

Security varies with mass, vulnerability, distance, and cover. The river adds to Red's security; we can not seriously bother his reserves except by crossing the river and seeking them out. If we get hung up astride the river, with our infantry on one side, our artillery on the other, Red will have an excellent chance to use his reserves, in comparative security, to inflict maximum loss on us.

The effectiveness of control varies with the degree of unity of effort resulting; it varies also with signal communication, physical capabilities, the training level and morale level, the hostile mass, and with distance, visibility and obstacles. There is no reason why Red, if he puts his means to good use, can not effectively control his defense, provided he disposes his means in depth, and establishes a flexible, mobile, elastic defensive system.

Finally: With such a defense Red can vary his dispositions from night to night. At present his combat power is

concentrated south of Marsh Creek. Where it will be tomorrow, we do not know.

(The foregoing is much more detailed than necessary. Much has been said above which could be and would be expressed very briefly, were it not that our primary purpose is to show how to use the principles in *thinking*.)

c. Conclusion as to enemy action.—The odds are in favor of a Red defense of the river line in depth, holding the river bank lightly, in general much as at present. The possibility of Red raids across the river can not be ignored. The possibility of a Red withdrawal must be borne in mind. Where Red strength or weakness will be encountered when we attack can not be predicted. His dispositions are flexible, and are favored by the terrain.

4. *Own situation.*

a. Plans open to you.—No plan that does not contemplate an attack should be considered, because: The mission (objective) requires us to facilitate the crossing of the corps and a rapid advance on Baltimore; this is *the effect we are required to produce*. The *means available* are such as to give us a reasonable chance of success if Red has only a reinforced brigade; in the absence of definite information to the contrary, we would have difficulty in justifying any action other than attack. *If we fail*, we will at least have obtained information for the use of the corps.

Since only an attack should be considered, this is not so much a problem of *major decision* (attack, defend, withdraw, etc.), as it is a problem of execution. In problems of major decision it is usually best to test each plan in terms of the principles (as we did for Red, above). In problems of execution it is usually better to base the estimate on the principles as a frame-work of discussion, and to work out the best plan as we go along. (Another good method is to follow an outline form covering the items in the plan for such an operation, and to apply the principles to each item as we proceed.)

b. Analyses of plans open to you.—That being the case, we will use our principles to discover *where* we ought to attack, *how* we should do it, and *when*. The *what* and *why* are already settled.

Objective.—To produce the *effect called for* in the mission, we should gain an objective on the ground at least as far

east as the eastern slopes of the ridge: Taneytown—Germantown, in order to protect the corps crossings from the fire of medium howitzers (about 11,000 yards), and to enable the corps to move directly on Baltimore. If Red gives way rapidly, we may press on to Baltimore ourselves. These considerations give us, then, our minimum and maximum specifications as to final objectives.

The first objective to seize is the terrain whence enemy close-combat weapons, especially machine guns, command the river and the beaches. The next objective to be seized is one such as will protect the beaches from very effective light-artillery fire (7000 yards) and which will give us space to dispose our troops east of the river, displace forward some of our artillery, and maneuver our reserves. The next objective is the minimum bridgehead for the corps, already noted.

Movement.—The next problem is to select routes leading toward the objective. The main routes of movement on Baltimore are generally through Taneytown. The farther north we cross, the narrower the river (the less the obstacle). But the farther north we cross, the more we increase the distance to Baltimore. If we cross south of Double Pipe Creek, we violate the terms of our mission. If we cross near but north of that stream, the unfordable Big Pipe Creek is an obstacle to movement to the southeast. There are no material obstacles in the river which will impede ferrying or bridging. There are numerous small streams which will facilitate putting pontons into the river.

On our own side of the river, there are numerous good roads to any part of the crossing front.

The best bridge-sites are those where approaches already exist; namely, at Bridgeport and Harney. Others nearly as good appear at the old fords: the bend north of Bridgeport, a point west of Palmer, and a point south of Barlow.

All in all, movement seems to favor a crossing more or less centered on the mouth of Marsh Creek.

In any case, we can not possibly attack tonight, as we are too far back to move up under cover of darkness and get our artillery in position, our pontons ready, and all our other means set for an attack before daylight. So the nearest time of attack is the night 10-11 January. Movement will be facilitated if infantry covering forces, artillery, and engi-

neers are pushed forward near the river tonight; the rest of the troops going up tomorrow night. If we are not across by daylight of 12 January, and *well established*, the corps movement may be delayed. That fixes the date.

As to the hour, the *later* we attack, the less time the enemy has to move reserves. But movement varies with distance, obstacles, and visibility. Even small obstacles are magnified at night. In some places the critical terrain where enemy machine guns will be encountered is close to the river; elsewhere it is as far as a mile back. Lacking detailed information of the ground (and we can not get it, since we have have only a day and a half for reconnaissance, and photography is our only practicable method) we must conclude from the map that almost anywhere we may find easy-going and hard-going side by side. Hence, since movement in the dark is difficult at best, we conclude that unless *there is some compelling reason* for attacking earlier, we had better cross our first-line battalions in time to form up on the east bank and advance at about daylight to seize the initial objective: namely, the machine-gun positions near the river. We will check up on this later.

Mass.—Our next problem is, how to dispose our troops to move them across the river on the selected objective.

We prefer to attack against weakness, but we do not always know where it is (or will be). That latter is true in this case. So far, the advantages noted under movement have pointed to a crossing generally north and south of Marsh Creek. The Blue observation here from Hoffman Hill is very good, also. However, the enemy may tonight shift his mass up to that area to meet us. He appreciates these conditions as well as we do. What can we do about it?

Well, we can revert to our principle, that *the effect of mass varies with the mass in opposition.* If we can not count on the enemy's present weakness opposite the Marsh Creek area remaining weakness of *Red's own volition*, what *method* can we use to induce him to keep this front weak? Let us try a feint, as far south as possible, to attract his reserves away from the critical front: suppose we make it just north of Double Pipe Creek. The configuration of the Monocacy River here will facilitate enfilade fire by supporting artillery. If we cross a reinforced regiment there just before daylight

tomorrow (a small force like this can readily move up and get set in time), or even on the next night (but early, before the main crossing), it may have the effect of pulling Red's reserves south (or at least of keeping them from going north). We will add to this impression of a main attack in the south, by moving the division just a little *southeast* tonight when we move forward to bivouacs nearer the river. We will still be able, then, to shift northeast on the night 10-11 January.

If the enemy reacts violently against this diversion of ours, the troops there will have a fine narrow bridgehead position available between the two unfordable streams. If he does not, we may even use this southern bridgehead on the night 10-11 January as a *main* crossing, feinting to the north instead (flexibility).

Another way to make the enemy relatively weak is to concentrate our own combat power. We perhaps can not concentrate our infantry in this case, because we will probably want to cross them on a broad front to *find enemy weakness and exploit it.* But we *can* concentrate our artillery fires and the smoke of our chemical mortars.

Mass influences the *hour of attack.* If the enemy is strong along the critical terrain covering the beaches, better attack him in the dark or under cover of smoke. We have not enough smoke to put on an attack in broad daylight on a wide front. In this situation the enemy is strong in some places, weak in others. We can not predict just how his close-combat weapons near the river will be disposed when we attack. We must assume the worst: that the best approaches will be adequately covered. Hence it is desirable to attack either during darkness, or in the dusky period of early daylight.

Inasmuch as we have seen that movement east from the beaches will probably be very difficult during darkness; and inasmuch as it is no use attacking at all if the troops are going to lose direction and control over rough-going in the dark, *we should attack from the beaches (on the east side) at about daylight.* This will also give the enemy least time to move his reserves to meet us.

Since the actual loading, crossing, and unloading will take about three-quarters of an hour, and it will take about half an hour to get set for an advance east from the landing-beaches, the crossing should begin about one and one-quarter

hours before daylight, plus another three-quarters of an hour as an allowance for misadventures: total two hours before daylight, or at about 4:30 AM. Any time from 3:00 AM to 5:00 AM is a reasonable hour.

Security.—Since *security varies with mass, vulnerability, distance, and cover,* we must reconnoiter intensively to keep track of the hostile *mass* (especially the reserves). An adequate infantry covering force must move up near the river tonight, to protect the artillery and pontons.

The numerous patches of small woods will provide cover.

The utmost effort must be made for *secrecy.* The artillery should not fire till the enemy discovers the crossing.

Our troops will be most vulnerable when astride the river, the leading infantry echelons across the water (say six to eight battalions), the rest of the division still in rear of it. This insecurity must be balanced by the use of *our own mass:* especially our reserves and artillery. The infantry must be established firmly on the light-artillery objective as soon as this can be done; then the artillery must displace by echelon, ferrying if necessary, and always having adequate numbers of cannon in position to protect the bridgehead. The bridges must be put across as soon as pontons are freed from ferrying, and with due regard to hostile artillery fire. When all the division is across, *then* the advance to the corps bridgehead should begin.

Control.—Control includes everything that relates to stability.

It involves the utilization of *moral factors,* including surprise. Hence secrecy is important to control: secrecy is a method of securing our own dispositions, and of surprising the enemy. This upsets the enemy's dispositions, and prevents his using his *mass* to upset *our* control. Our diversion to the south is another method of upsetting the enemy's stability.

Control is rendered difficult by long *distances, obstacles,* and lack of *visibility.* Hence we must take special measures to carry our *signal-communication* system across the river (an obstacle) and extend it to the east. We must use our airplanes extensively to supplement our ground system of communication. We must warn all ranks as to the difficulties to be expected in moving at night; and this reinforces our

argument that the hour of attack from the beaches on the east bank of the river should be at about daylight.

We must endeavor to have our men, when they enter the pontons, fresh and in good spirits: in the best *physical condition* and of *high morale*. It would be desirable today, if we could, to get some *training* in entering, handling, and leaving pontons.

Suppose we cross on a broad front from Bridgeport north to Barlow, as seems to be desirable. Can this crossing be *controlled* by the means at our disposal? This is a front of about 10,000 yards. The answer is definitely yes. We put in signal communications frequently for wide envelopments which are initially made on broader fronts. It can be done.

5. *Decision.*—To force a crossing of the Monocacy River —Rock Creek at 4:30 AM, 11 January, on the front: Bridgeport—Barlow, with brigades abreast, making a diversion at 4:00 AM, 10 January with a reinforced regiment in the area just north of Double Pipe Creek; in order to seize the high ground along the general line: Taneytown—Germantown, and facilitate the crossing of the I Corps and its rapid advance on Baltimore.

All the details of the plan of attack, each of which requires a minor decision, can similarly be worked out by the use of the principles.

It is hoped that this problem has shown that it is possible to fulfill the promise of Field Service Regulations, by evolving a set of simple, unchanging, practical, basic principles of war—principles of the same order as prevail in all sciences, and which conform to Marshal Foch's dictum: "fixed principles of variable application."

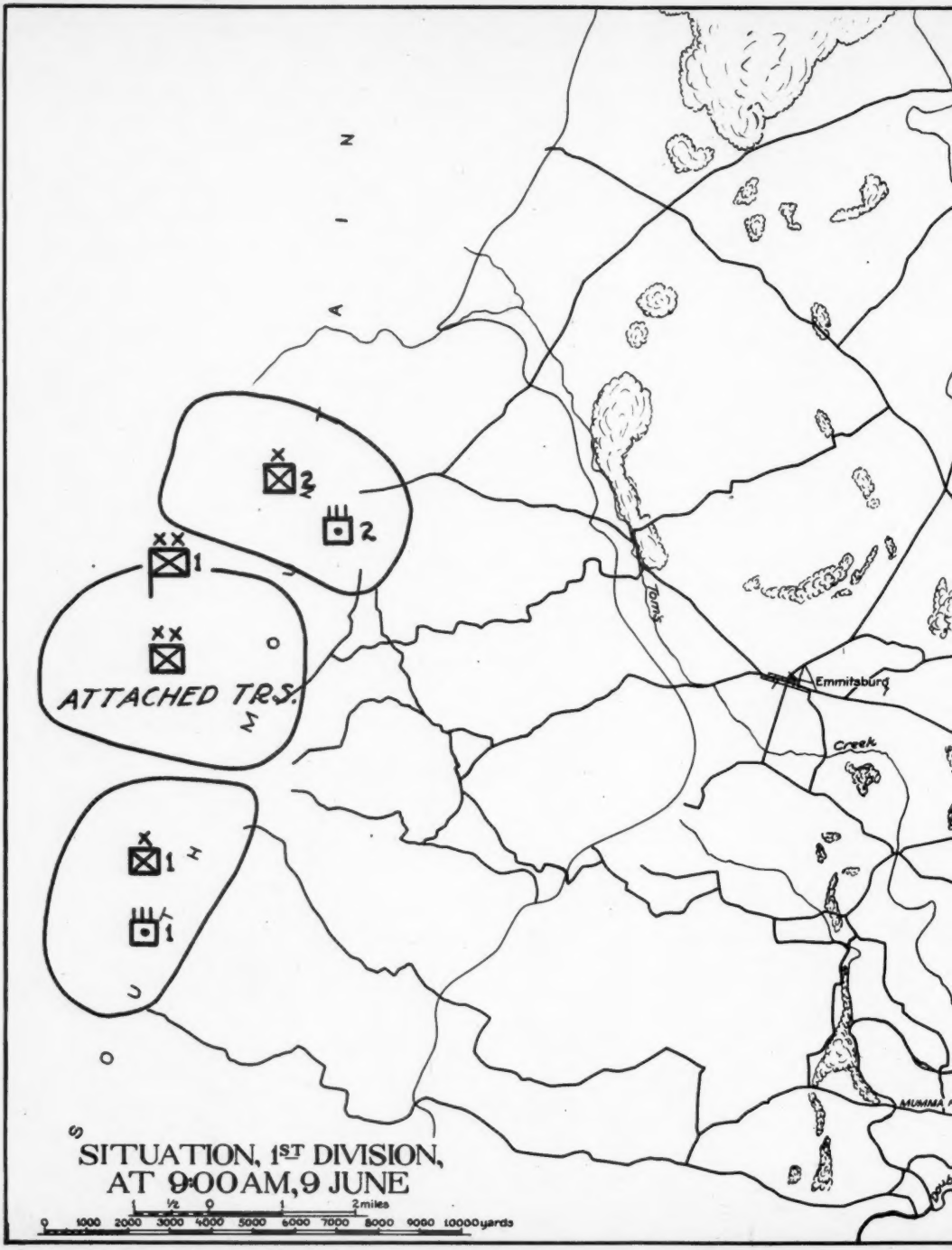
It is hoped that this problem demonstrates that the determination of the basic factors of war is feasible; that the knowledge thus represented can in fact be organized by expressing the relations among the basic factors by a set of principles.

The trained tactician does consider, and always has considered, these factors. He checks them off rapidly and accurately in his mind. He weighs them as we have weighed them here. In short, he uses the system we advocate here. But he uses it without having actually formulated it in words.

It is a reasonable belief, founded on observation of other sciences, that an organization of knowledge of war into a science of war such as this, will make expert tacticians more expert, and will give us more of them.

The soldier who appreciates that there is such a thing as a science of war, which underlies the art of war, will be able by his "thorough knowledge of the principles of war and of their application," as our Field Service Regulations says, "to determine what methods should bring success." For him, as the British Field Service Regulations puts it, "the correct application of principles to circumstances" should be "the outcome of sound military knowledge, built up by study and practice until it has become an instinct."

Particularly should a science of war be useful to the soldier of today, who is witnessing what is perhaps the most rapid and radical change in military forms in all history. No matter how different the next war from the last, that soldier should be least at a loss whose knowledge is grounded on a practical appreciation of the existing values of the basic factors of war, and on these unchanging elements of war: the objective of combat power, the movement of combat power, the intensity of combat power, the security of combat power, and the control of combat power. The basic problem of war appears always to have been, and so will probably always remain, how to obtain *unity in the application of combat power through the control of the movement of secure mass to attain the objective.* On this reality, so far as seems apparent now, will always be founded any practical, simple, and useful organization of knowledge which constitutes a science of war.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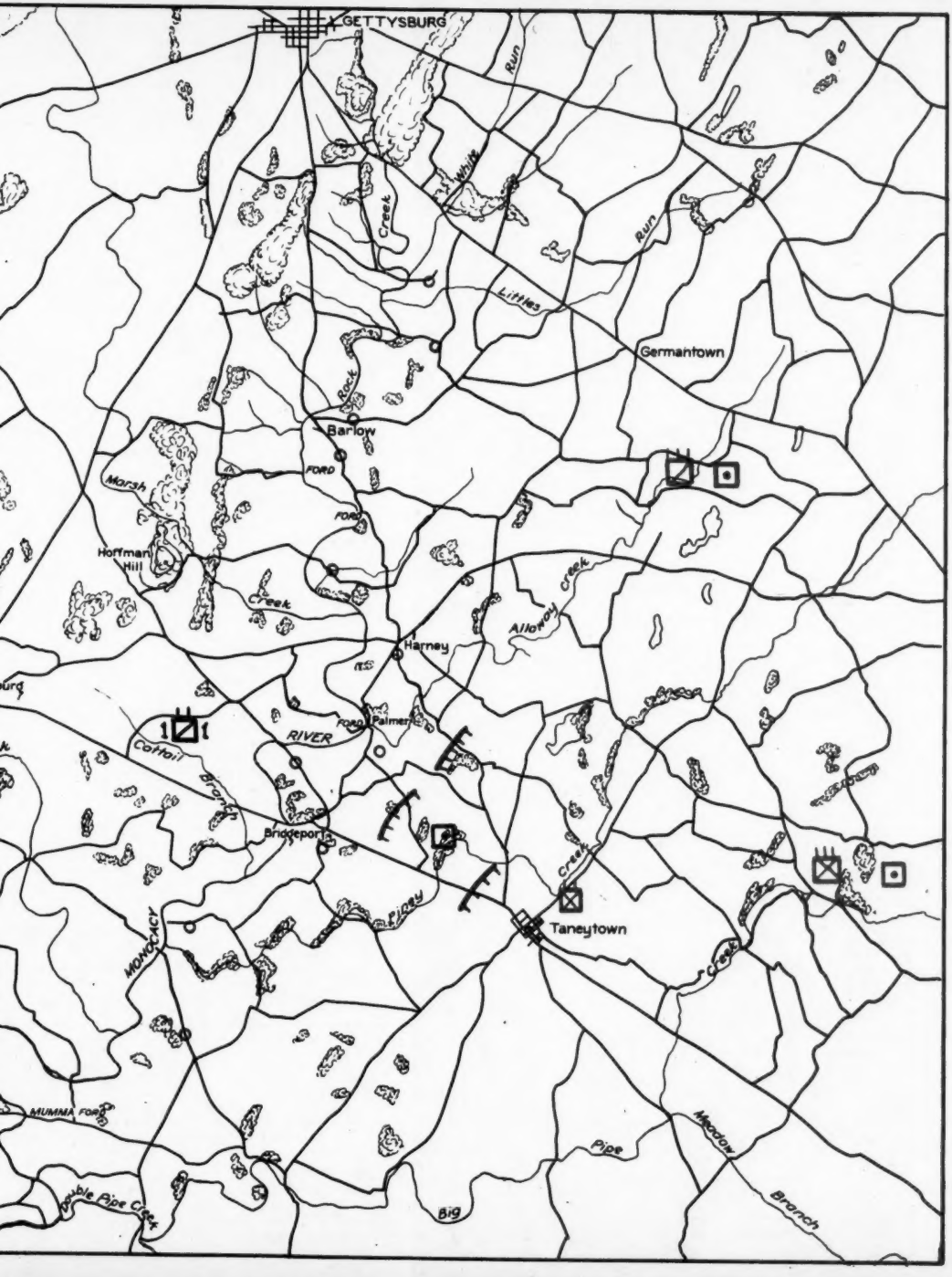
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MONOCACY
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MUMMA FORD
Pipe
Meadow
Branch
Big
Pipe Creek

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Section 5

ACADEMIC NOTES, C. & G.S.S.

REPRINT OF CURRENT SCHOOL MEMORANDA, WHICH AFFECT INSTRUCTIONAL PROCEDURE OR TACTICAL DOCTRINES.

CONTENTS

Tanks and Combat Cars

[Memorandum of 31 October, 1933]

1. SUITABLE TERRAIN.—In the field, a commander must decide whether or not it is practicable to use tanks in a given area from his knowledge of the ground as obtained by reconnaissance and from the study of maps and other sources of information. The same procedure must be followed in the Map Problem. There can be no general rule that large areas are, or are not, suitable for the use of tanks. Areas shown as wooded are usually impassable for light tanks except by roads or trails. The steepness of slopes can be determined from the contours. Streams unfordable or fordable with difficulty for infantry can not be forded by tanks or their carriers. Other streams vary in degree as obstacles to tanks. Their effectiveness as obstacles must be judged from their appearance on the map unless additional information concerning them is given in the problem.

2. ATTACHMENT.—In attacks in open warfare situations it is usually impossible to foresee where or how reserve infantry battalions will be used. For this reason it is not desirable to initially attach tanks to battalions which are not initial assault battalions.

3. COMBAT CARS.—The above applies in general to the employment of combat cars.

Motor Battalion, Quartermaster Regiment

[Memorandum of 4 November, 1933]

1. The Motor Battalion, Quartermaster Regiment, consisting of ninety-six 1½-ton trucks is used for hauling supplies and for troop movement.

2. When the division is not engaged in combat this battalion usually bivouacs near the railhead.

3. When the division is engaged in combat the primary use of the motor battalion is to give greater mobility to the division reserve. In an attack by a division acting independently a sufficient number of trucks to transport one infantry battalion, less animals, should be held in readiness to move the division reserve, or part of it, without delay. It should

be bivouacked, out of effective enemy artillery fire, convenient to an entrucking point for the division reserve.

4. The division field order, under paragraph 3 x, should contain a paragraph to carry out these instructions.

5. The motor battalion will be kept ready for troop movement as long as the supply situation permits or until the necessity therefor ceases.

Discontinuance of the Term "Axial Road"

[Memorandum of 13 November, 1933]

1. Heretofore the principal in-road used in the supply of a division was termed the *axial* road, in view of the fact that supply and evacuation establishments of the division were grouped with approximate symmetry along this road. The *axial* road was announced to the command as that single road which would be maintained by the division engineers for use under all weather conditions.

2. In wide envelopments the units of the division both in the attack and in the defense are so separated as to make it difficult, if not actually impossible in a majority of cases to supply all elements of a division from a single road. The term *axial* therefore loses its significance. No longer can the supply and evacuation establishments be symmetrically located about a single principal supply road.

3. Hereafter the term *axial* road will not be used in referring to the principal supply road or roads. Each road used for the supply and evacuation of any element or unit of the division, which element is located with respect to the division as a whole so as to require, or make desirable, the use of a separate supply road, will be described or designated as the *principal* (*or main*) *supply road* for that particular element or unit.

4. In an offensive or defensive situation where the division is acting as an interior division which is part of a larger unit, the principles governing the designation of the principal supply road or roads are unchanged. Even in these situations, however, the term *axial* road will no longer be used. If but one in-road is used for supply it will be referred to as the *principal supply road*, the *main supply road*, the *principal in-road for supply*, or in some such manner as will describe the situation rather than fasten a definition on a single element thereof.

Orders for Maintenance of Secrecy

[Memorandum of 6 December, 1933]

In operations involving secret movements or concealed assembly areas, careful consideration must always be given to what minor movements, if any, are permissible. Such permissible movements are those which, even if seen by the enemy, give him no information of our intentions. For example:

1. If it is desirable to deny the enemy absolute knowledge of the presence of *any* troops or installations in an area, then the order should state, "Movements of any kind during daylight hours are forbidden."

2. If the situation is such that the presence of small units—such as cavalry patrols—in an area will not disclose our intentions to the enemy, then the order should state, "Movements of any kind during daylight hours are forbidden except (those of normal reconnaissance agencies)."

3. If supply trains and installations must function during daylight, the order should specifically permit it.

In substance, the commander must decide in advance just how much movement, if any, is permissible, and issue specific orders accordingly. If no movement is ordered, the order will be interpreted and executed literally.

Tactics and Technique—Infantry (Tanks)[1]

SECTION I

[Memorandum 1 March, 1934]

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1. WHAT.—*a. Definition.*—The tank is a self-propelled armored tractor.
b. Types.—(1) Classification by weight:

Light tank: capable of transportation by truck; up to about eight tons.

Medium tank: not transportable by truck, but capable of crossing usual highway bridges; 8 to 25 tons (approximate limits).

Heavy tank: too heavy for usual highway bridges without reinforcement; over 25 tons.

(2) Classification by speed: *slow* and *fast.*

(3) Classification by organic assignment:

Division (infantry and cavalry).

GHQ reserve: includes variable numbers of tanks. Organized into regiments. (See *Tables of Organization.*)

(4) Classification by basic mission [for a more extended treatment, see *Infantry Field Manual,* Volume II (Tank Units), Chapter 5, Section I].

(a) *Leading tanks:* To break through or go around the hostile position, in order to disrupt the enemy's defensive system in its rear areas. They attack artillery, reserves, communications, command posts. They cooperate with cavalry (horse or mechanized) and with exploiting tanks.

(b) *Accompanying tanks:* Tanks to render close cooperative assistance to the foot-troops.

(c) *Exploiting tanks:* Tanks held in reserve initially to be used as a striking force to exploit success.[2]

2. WHY.—The tank arose through the need of moving protected power to locations where it can deal effectively with hostile automatic arms.

3. WHERE AND WHEN.—*a. Characteristics (powers and limitations).*—The important characteristics of all tanks relate to their capabilities and limitations as to *movement, protection,* and *combat power* (fire-power and shock-power). Factors as to *movement* include fuel distance, maneuverability, mechanical reliability, speed, and obstacle-crossing ability. Factors as to *protection:* size of target presented, armor, powers of movement (above), protection against chemicals, and noise. Factors as to *combat power:* armament, and shock-power (weight, powers of movement).

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[1]The above memorandum on Tanks supersedes the one published in RML No. 51, page 105. (EDITOR)

[2]NOTE.—*Reserve tanks* are tanks held in reserve for any purpose. They may be intended for use eventually as leading, accompanying, or exploiting tanks.

b. Powers.—See *Infantry Field Manual,* Volume II (Tank Units), pages 2-7, and *Special Reference Data* (on tanks) issued. In general, the tank is the most effective close-combat antimachine-gun weapon.

c. Limitations.—(1) *Mechanical limitations* [see current *Reference Data,* especially *Infantry Field Manual,* Volume II (Tank Units), pages 2-7].—The tank is primarily an offensive weapon. It can, in general, hold ground only by offensive action.

(2) *Limitations imposed by hostile combat power.*—The light, mobile, quick-firing cannon is the principal enemy of the tank. A direct hit may put it out of action. Large-caliber machine-gun bullets may disable it. Its tracts are particularly vulnerable. Mines may also disable it.

(3) *Limitations imposed by terrain.*—Includes following obstacles:

Tank-traps (pits; deep shell-holes with perpendicular sides; small parallel slits which may trap the tracks and so cause the tank to "belly").

Tree stumps and big rocks (cause "bellying").

Deep mud; deep trenches; extremely steep slopes.

Thick woods including trees too strong to be pressed down, and with intervals narrower than the width of the tank.

Barricades in towns.

Water deep enough to affect the carburetor (except for amphibious tanks).

4. How.—*a. Underlying principle.*—The effective use of tanks calls for unity of effort, and, as for any other weapon, varies with their *objective, movement, security, mass* (intensity of combat power), and *control.* As a general guide, they should therefore be employed to further the basic plan of maneuver (unity of effort), their mass being employed in the priority (1) decisive effort (including reserves), (2) secondary efforts; the latter in the priority determined by the degree of assistance they give the decisive effort, *provided that the ground be suitable.*

b. Fundamentals of employment.—Against decisive *objectives* the capture of which will give the maximum assistance to the basic scheme of maneuver.

By routes of *movement* practicable to the tanks.

With the available tank *mass* disposed so as to render maximum assistance to the decisive effort.

The tanks, in turn, being furnished *security* by their own infantry foot-troops, artillery, aviation, and chemical troops against the hostile antitank weapons. (Provision for counterbattery fires, protective artillery fires, aviation support, *smoke;* proper delimitation of command areas.)

The necessary *control* to be exercised to coordinate the tank effort with all other weapons, and to obtain maximum tank effect by the use of surprise. Exercised by commanders charged with responsibility for success: leading and exploiting tanks, by division, corps, or army; accompanying, down to infantry battalions.

c. Leading tanks.—(1) *Desirable characteristics.*—Relatively great mobility (including ability to surmount obstacles); relatively great firepower and shock-power (crushing power); relatively great protection armor and speed).

(2) *Control.*—Under control of higher commanders: division, and—for large forces—usually corps and army. Coordination with aviation and artillery is important. Cross line of departure within time limits fixed in orders. On completion of missions, move to assembly positions.

(3) *Objective.*—The objective is the enemy rear area. Often, must first break through his battle position. Supported by artillery and aviation, especially with smoke.

(4) *Formation.*—Depth, according to situation (example, for regiment: line of battalions, in line of companies, in column of platoons; more front can be covered by attacking with two platoons of a company in assault, one in reserve).

d. Accompanying tanks.—Desirable characteristics.—At least average mobility and combat power (fire-power and shock-power); relatively great protection (armor). Usual allotment of light tanks will not exceed one platoon per infantry battalion; control, by infantry battalion. Where heavy or medium tanks are used as accompanying tanks, usual allotment is one company to a division; control under echelons higher than the infantry battalion.

e. Exploiting tanks.—Desirable characteristics: Relatively great mobility (speed); at least average combat power (fire-power and shock-power) and average protection. Utilized to attack important enemy reserves and neutralize hostile reaction.

5. TYPES OF TANKS IN INFANTRY DIVISION.—*a. Light slow.*—(1) Organic complement, one company of three platoons.

(2) May receive reinforcing tanks from GHQ reserve: maximum probably one battalion of three companies, totalling nine platoons; aggregate then 12 platoons, one per infantry battalion.

b. Light fast.—From GHQ reserve; maximum light slow and fast available to division will probably not much exceed one platoon per infantry battalion.

c. Medium fast.—From GHQ reserve; maximum medium fast tanks made available will probably rarely exceed a company per infantry division.

d. Heavy slow.—As for medium fast tanks.

6. DIVISION TANKS ON MARCH (ADVANCE).—*a. Light slow.*—(1) *Objective.*—To assist foot-troops to gain their objective. Rarely used as other than accompanying tanks.

(2) *Mass.*—Employed to further mission of division (purpose for which march is made). Attachment to flank guards must be justified by probability of offensive action and by factors governing any detachment.

(3) *Movement.*—Usually on trucks (except for short distances) to avoid mechanical deterioration. Therefore separated from tractor, animal, and foot elements. By bounds. Avoid muddy or high-crowned roads. Of practicable routes, select that leading to area of probable employment on conclusion of march. If division to attack, tanks on trucks should usually precede motors of medium artillery (owing to time element); if to defend, follow. If roads very bad, may have to leave these tanks in rear to follow by bounds later. Reinforcing elements may come in by rail.

(4) *Security.*—Usually move in main columns. Rarely with advance guards (because slow tanks on trucks present good targets to enemy artillery).

b. Light fast or medium fast tanks.—(1) *Objective.*—As for light slow.

(2) *Mass.*—As for light slow tanks. Rapid movement may justify more frequent detachments. If enemy has fast mechanized elements, and we lack mechanized cavalry of sufficient strength, may utilize fast tanks in lieu of cavalry, or to reinforce it. See *security*, below.

(3) *Movement.*—Fast tanks may move under own power; light fast tanks may move on trucks, in which case same limitations apply as to light slow. Movement in the march columns is by bounds, separated from elements of lower march-rate, as for light slow tanks on trucks.

(4) *Security.*—Moving under own power, fast tanks may provide own security. Security of division may require use of fast tanks on cavalry missions, as noted under movement above.

7. DIVISION TANKS IN DEVELOPMENT.—*a. Development for coordinated attack in a meeting engagement.*—Tanks usually sent to assembly position(s), conforming to following:

> *Objective:* Convenient to locality of probable employment.
>
> *Mass:* Sufficient space for the tanks involved; distribution of tanks in assembly positions (if more than one such position), according to probable employment (see attack). Attachments to brigades justified if probable employment can be foreseen at the time.

Movement: Assembly position(s) convenient to present location of tanks (in column; consider routes) and with practicable routes forward to probable area of employment. Well forward. With hard standings. Tanks on trucks will not detruck here if it is practicable to move farther forward on trucks and to detruck nearer area of employment.

Security: Beyond effective range of enemy light and medium artillery. Cover (town, woods, reverse slope).

b. Development for piece-meal attack.—Usually attached to brigades; fast tanks may be committed under division control.

c. Development for defense; position in readiness.—In assembly position, as above, under division control. Assembly position to be convenient to reserve position to be occupied by tanks.

d. Development for a deliberate attack.—For example, of a well-organized position or of a defensive zone, where one or more nights are available for preparations. Movement is by a series of stages, according to the time available, from *position* to *position*. Tanks come up by water (all types); rail (all types); truck (light tanks); or own power (fast, medium, and light tanks).

e. Examples of order for development.—(1) *In developing march columns.*—The 1st Tank Company will move to an assembly position in the vicinity of..... (Or:) The 1st Tank Company, moving via (route) to (locality), will be attached to the.....Brigade on arrival.

(2) *In developing for deliberate attacks.*—Uusally covered by appropriate part of march table.

8. TANK MOVEMENTS AND POSITIONS.—*a. Positions.*—(1) *General characteristics of tank positions.*—[For a more extended treatment, see *Infantry Field Manual*, Volume II (Tank Units), Chapter 5, Sections III, IV, and V.] The movement of tanks into assault positions, especially when considerable numbers of tanks are employed, involves so many vehicles of varying characteristics that movement is necessarily made from position to position. The important types of positions are noted below. Their general characteristics, common to all, include:

Favorable locations to to the *objectives* against which the tanks are to operate.

Favorable routes of *movement* from rear and to front. Water for motors and personnel.

Appropriate location and dimensions for the *mass* (number) of tanks concerned.

Suitable *security* from enemy observation and fire.

Relations such that adequate *control* may be exercised to insure surprise.

(2) *Examples.*—Woods; towns; open fields, with camouflage.

(3) *Types.*—Including the following:

Entraining and detraining points
Parks
Intermediate positions
Points of deployment
Assembly positions
Assault positions
Line of departure (included here as a tank "position," for convenience of discussion)
Reserve positions
Reservicing points.

(4) *Entraining and detraining point.*—A point on railroad, at which tanks are to be entrained or detrained. Should afford necessary heavy equipment for handling tanks. Detraining point favorably located with reference to road-net forward to next tank position. Preferably beyond effective range of enemy light and medium artillery.

(5) *Park.*—A base in the forward area from which a tank unit operates in field. For large forces, established by army or corps. Base for administration, supply, maintenance. Not much over two (2) hours from detraining point; location convenient to locality where tanks will fight; on a satisfactory road-net from detraining points forward; beyond effective range of hostile light and medium artillery; liberal amount of space; good overhead cover; firm ground for motors; adequate water. Large centralized parks facilitate supply and maintenance: for example, one per corps for all tanks operating on its front; priority of standings given to heavier equipment.

(6) *Intermediate position.*—A place of concealment, between parks and assault positions. Make final preparations here for combat, including reconnaissance, planning, supply, cooperation with other arms, dropping excess baggage. All transportation except combat tanks remains in or returns to parks. Intermediate position usually ceases to exist when the attack is launched. Occupied during part of night preceding attack, or for one or more days. Fast tanks may not require intermediate position; or time may prevent its use, as in counterattack. Usually three to five (3 to 5) miles from line of departure. Usually one intermediate position for accompanying tanks of each division, and for each battalion of leading tanks. Closer to front than parks; so it requires defilade or better cover. Otherwise characteristics same.

(7) *Points of deployment.*—Where battalions, companies, and platoons break up to proceed to assault positions. Location such as to avoid enemy fire and aerial observation at night. Central to zone of action. Battalion point, about one mile from line of departure; corresponds to *detrucking point* of organic light tank company of division in attack in a meeting engagement. Refill here with gas, oil, water.

(8) *Assembly position.*—(a) A locality where division tanks assemble prior to battle. See paragraph 7.

(b) A rallying point to which tanks are to move on completion of any mission. Located so as to facilitate next movement contemplated (on additional objectives or to the rear), to utilize available protection (cover; other troops), and to insure effective control by higher command.

(9) *Assault position.*—Where the tank platoon, or other unit, awaits proper time to cross line of departure. Concealment, defilade, route forward for each tank. Close in rear line of departure.

(10) *Line of departure.*—Line which leading elements are to cross at the given hour of attack; a coordinating line. Leading tanks usually cross it first, then accompanying tanks usually followed by foot-troops. Tank lines of departure may be in rear of general line of departure, to get better cover or better coordination.

(11) *Reserve position.*—A locality where tanks are to be in reserve. Suitably located with reference to probable objectives when used (as in counterattacks). On appropriate routes of movement from rear and to locality of probable employment. Cover. Suitable location with reference to control by higher command.

(12) *Reservicing point.*—Locality where tanks are to be resupplied and reconditioned. Usually a tank-company establishment. Appropriately located for next tank mission: as, to re-engage in combat. On appropriate routes toward locality of next employment and from supply establishments.

b. Movement. [See *Infantry Field Manual*, Volume II (Tank Units), Chapter 4.]—(a) *Rail.*—Secrecy requires that tanks be moved in and detrained during darkness, and that no sign of their presence be given in daylight. By daylight tanks must be in parks or intermediate positions established beforehand. Tanks detrain and move in small groups or by single vehicles to park; road must be reserved; no cross-traffic permissible. See current *Reference Data* for trains needed, and for time needed to unload. Add time to reach park (not much over two hours). No trains should be brought in so late as to prevent unloading and reaching park by daylight.

(b) *Truck.*—Light tanks. Into parks under cover of darkness. Convoys must not cross road: tank detraining point—tank park. Move without lights in forward area. Speeds: see current *Reference Data.*

9. DIVISION TANKS IN ATTACK.—*a. Basic considerations.*—Movement of controlled and protected mass to gain division objective. Priorities: (1) decisive effort including reserves; (2) secondary efforts, in the priority in which they assist decisive effort; provided ground is suitable.

b. Light slow tanks.—(1) *General.*—Rarely employed other than as accompanying tanks; usual allotment, one platoon per infantry battalion.

(2) *Allotment.*—(a) Based on:

Objective of division.

Movement thereto: practicable routes for tanks (absence of obstacles).

Mass: estimate the strength of hostile forces that will oppose the movement (include reserves), and the time and place of contact therewith. Determine when and where, in general, the *decisive phase* of the action will occur: *that is the place to employ the tank combat power.* Set up a priority (1, 2, 3, etc.) as to the infantry battalions which should have tanks, or, if this can not be foreseen with sufficient certainty, set up a priority as to echelons of command which should have tanks available. (Within the regiment, the probable employment of battalions can often be foreseen; in the brigade and division, such protection of the maneuver in detail is more difficult.)

Security: consider whether enemy antitank dispositions point to any change in this priority. Adjust priority. Consider whether the security of the decisive effort of the division calls for tank strength *on the flanks* of the decisive effort, rather than *with* it. Readjust priorities.

(b) Division allots to brigades and to its own reserve; brigades, similarly, to regiments and to brigade reserve; regiments to battalions and to regimental reserve; each commander visualizing his plan of maneuver and its alternatives.

Examples of priorities may be as follows:

For an attack (envelopment or penetration) against a relatively weak defense in a comparatively obscure situation: (1) division reserve, (2) brigade reserve of decisive maneuver, (3) regimental reserves of decisive maneuver, (4) assault battalions of decisive maneuver, (5) holding attack;

For a penetration against a relatively strong, well-organized defense, in a comparatively clear situation: (1) assault battalions of decisive maneuver, (2) regimental reserves of same, (3) brigade reserves of same, (4) division reserve, (5) secondary effort; *always providing* that the battalions in question will probably require tanks to deal with hostile holding forces or reserves, and also that the ground is suitable.

This priority will vary in detail according to the situation. Every situation must be solved on its merits. Frequently a holding attack on a restricted front will be assigned a relatively high priority for tanks: this in order to give the impression that it is the decisive attack; or because the holding attack is necessarily restricted as to other forms of combat power; or because the ground in the zone of the decisive maneuver is in part unsuitable for tanks.

(3) *Examples of orders.*—(a) *When organic tanks, only, are present.*—The 1st Tank Company is attached to the.....Brigade. (Or:) Two platoons, 1st Tank Company, are attached to the.....Brigade; one platoon is attached to the.....Brigade. The company (less three platoons) will await orders under division control at (usually a location favorable for supplying, servicing, and providing replacements for the platoons).

(b) *When reinforcing tanks are present* (for example: battalion, less one company).—The 1st Tank Company (usually attached to decisive attack, as presumably better trained in operating with foot-troops of division) and Company A, 901st Infantry (light slow tanks) are attached to the.....Brigade. Two platoons of Company B, 901st Infantry (light slow tanks) are attached to the.....Brigade; one platoon will await orders at (near division reserve). The 1st Battalion, 901st Infantry (light slow tanks) (less detachments) will await orders under division control at (usually park).

(c) *When units split.*—When a company is split, part going to one subordinate unit and part to another, company headquarters remains under control of next higher unit, to facilitate supply and control.

(d) *Initial attachment.*—To preserve flexibility of tank employment, only the tanks allotted to assault battalions are usually attached thereto initially; those made available (allotted) for probable use with reserves of regiments, brigades, and division are usually held in reserve initially in the regiment, brigade, or division, respectively, until committed to action.

(4) *Detrucking area.*—In attack in a meeting engagement, tanks move from initial assembly position(s) to detrucking area(s) farther forward. This detrucking area corresponds to battalion point of deployment (see above). Should have cover from fire and observation, hard standings, good routes forward across country to assault positions, be central to zone of action of unit concerned, and as near to the line of departure as security will permit.

c. Light and medium fast tanks.—May be employed as accompanying tanks. May be employed in whole or part, under division control, either independently or attached to cavalry, and either as leading or exploiting tanks. Examples of methods of employment may be as follows: (1) tanks, under division control, with or without cavalry, may attack on one flank, drawing hostile reserves away from the other flank where foot-troops are attacking; (2) foot-troops may attack on one flank to attract the hostile reserves, while the tanks attack the other flank; (3) tanks may lead the decisive attack; (4) tanks may extend the flanking maneuver of the foot-troops. Conditions permitting, the most decisive results are obtained by an encirclement of one flank, combined with a distraction on the other, both directed at objectives the gaining of which will materially disrupt the defense. The employment may be influenced by the necessity of providing security for the foot-troops.

10. DIVISION TANKS IN DEFENSE.—Tanks in defense are utilized to counter hostile tanks and for counterattack. They usually move to a covered locality near the division reserve, in order to be available therewith. Hard standings desirable. Tanks usually detruck. The tank units are not usually attached, initially, to the division reserve, but are held in reserve, platoons being sent out as needed, for attachment to reserves of lower echelons for counterattack; finally, the remaining tank elements are utilized with the division reserve when committed for counter-attack. Tank elements may be disposed to protect flanks and rear from hostile mechanized forces (especially hostile fast tanks).

11. TANKS IN SPECIAL OPERATIONS*.—*a. Pursuits.*—Fast tanks with encircling forces (may constitute encircling force). Slow tanks with direct pressure. Slow tanks may be useful with encircling force.

b. Withdrawals.—Utilized under division control or by attachment to lower units, to assist withdrawal, principally by flanking attacks, repeating the operation on one position after another as necessary. Smoke assists in gaining surprise (tanks may use smoke candles). Use of tanks at night limited by conditions of visibility.

c. Rear guards.—Employed as in withdrawals. Tanks so used usually attached to rear guards. There is danger that slow tanks so employed

*For a more extended treatment, see *Infantry Field Manual*, Volume II (Tank Units), Chapter 5, Section II.

may be lost; hence advisability of using them or conserving them must be carefully weighed.

d. Repelling counterattacks.—It is preferable to employ tanks from a flank. Especially valuable against hostile tanks.

e. Reconnaissance and counterreconnaissance.—Fast tanks only are used. Conservation of tanks will probably call for sparing use. Such employment may be necessary for security, as when enemy has mechanized cavalry and we lack it.

SECTION II

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1. WHAT, WHY, WHEN, WHERE.—See discussion in Section I. See *Tables of Organization* for organization of tanks in GHQ reserve.

2. HOW.—*a. Principles.*—For principles of employment, see Section I. For large forces, mass and security call for employment of tanks in large numbers, on broad fronts, in order to obtain decisive results and to minimize effects of hostile antitank defenses. Mass also calls for appropriate depth in the tank attack, to provide successive impulses (continuity). Control and security, alike, call for utilization of surprise and secrecy. [For a more extended treatment, see *Infantry Field Manual*, Volume II (Tank Units), Chapter 5, Section II.]

b. Allotment.—(1) *Based on plan of maneuver.*—Priority is given to the decisive effort, and thereafter to secondary efforts in priority according to degree in which they assist decisive effort, provided ground is suitable. Set up a priority series, and allot accordingly.

(2) *Echelons.**

GHQ allots to army.

Army allots to:
- Leading missions
- Corps
- Army reserve.

Corps allots to:
- Leading missions
- Divisions
- Corps reserve.

(3) *Allotting leading tanks.*—Consider front and depth. If mission in zone of one corps, corps usually controls tanks; if in zone of two or more, army.

(4) *Allotting exploiting tanks.*—Consider enemy reserves and organization of rear area, especially enemy reserve tanks. If mission will probably be in zone of one corps, may allot bulk to corps; if in zone of two or more, army usually controls.

(5) *Special operations.*—See Section I, the underlying ideas being adapted to the larger units involved here. Corps and army counterattacks are essentially no different from other attacks, except that there is only a limited advance and there is relatively little time to accomplish the

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*NOTE.—Army and corps think in terms of divisions, but must at all times have in mind the picture of divisions in terms of battalions, in order to make allotments of accompanying tanks.

To preserve flexibility of tank employment, tank elements are usually *attached*, initially, only to assault divisions; those *allotted* to (made available for) reserve divisions (or other units in reserve) are usually held initially under the control of the next higher echelon of command.

necessary preliminary movements. Less tank depth needed; hence fewer accompanying tanks. If the necessary advance is sufficient to warrant, leading tanks may be used. Objective: some feature essential to success of counterattack; cover consolidation; then assemble in rear.

c. Movement.—(1) See Section I, as to tank positions and movements thereto. Must be carefully controlled to insure completion of dispositions desired, with secrecy.

(2) For details of rail movements, see form herewith.

DETRAINING TABLE
INFANTRY (TANKS)

Number of train in order of arrival	*Time train reaches transfer point*	*Detraining station*	*Time train reaches detraining station*	*Time unloading of train is completed*	*Time tanks reach park*
	The transfer point is a point in the rear area where tank movement passes to army (corps, etc.) control.	Avoid assignment of two or more trains to same train-siding. Last train in, each night, goes to that detraining point whence the tank units can most quickly reach their parks; this to avoid exposing tanks after daylight in case of delay.	Add to time train reaches transfer point, time required to reach detraining station. After all available track-space at a given detraining station has been occupied, later trains can not enter that detraining station until the necessary track-space has been vacated by preceding trains.	Add necessary time to the time of arrival at detraining station.	Tank units moved by vehicles or small convoys from detraining station to park. Calculate time required, and add to time when unloading completed.

3. TANK COMBAT ORDERS.—See *Infantry Field Manual*, Volume II (Tank Units), Chapter 5, Section X.

4. MAINTENANCE*.—*a. Echelons.*

(1) Tank crew.
(2) Maintenance section, headquarters platoon, tank company.
(3) Maintenance platoon, tank battalion.
(4) Maintenance company, tank regiment.
(5) Ordnance Companies (heavy maintenance) and quartermaster repair battalions, army.

b. Character of work.—Each according to time usually available, skill of personnel, tools, and supply of spare parts.

*For extended treatment see *Infantry Field Manual*, Volume II (Tank Units), Chapter 6.

Section 6

BOOK REVIEWS

CONTENTS

Altrichter, Major Friedrich.—**Die seelischen Krafte des Deutschen Heeres im Frieden und im Weltkriege.** [The morale of the German Army in peace and war.] Berlin, 1933—244 pp...M 501-G4.43

CONTENTS: Die seelischen Kräfte des deutschen Heeres im Frieden; Die seelische Entwicklung des Heeres im Weltkriege; Seelische Probleme innerhalb des Heeres.
[The morale of the German Army in peace; The development of morale in the World War; The problem of morale.]

Reviewed by Captain F. During, Infantry

This book is a psychological study of the German soldier before and during the late war. The author claims that the high morale of the German Army before the war was due: (1) to the traditions of the army; (2) to the belief that the German Army was the best and largest in the world; (3) to the feeling that it could not be beaten; (4) to the esprit-de-corps which existed in the German Army; (5) to the strict mass and self-discipline; and (6) to the belief in their leaders.

Up to 1917 this morale became much higher, but in 1918 the enlisted men changed considerably. This was due to the fact that the Allies became superior in number after America's entrance into the war, which forced the troops to be at the front longer and longer. Rest which they needed so badly was not given them. The lack of material, especially food, became acute, and the unrest at home completed the lowering of the morale of the enlisted men. According to the author, the morale of the officers, however, never changed, even during the critical days of 1918.

In each historical phase there is always one thing which occurs at that particular time and pertains only to that particular phase, and which, having a direct bearing on the outcome of that phase only, can not be set down as typical; therefore, the author wants it understood that the loss of morale of the German Army should not be considered as typical of the German soldier.

The book is of interest to every student of psychology.

Beatson, Major-General F.C.—**Wellington: The Bidassoa and Nivelle.** London, 1931—224 pp.....M 94606-J3-K

CONTENTS: Preface; Introduction; Wellington's position—His advantages—Some of his difficulties; Soult's appointment to the command of the French Army; Resumption by the Allied Army of its positions along the Franco-Spanish Frontier, after the Nine Days' Fighting in the Pyrenees; The French Army re-enters France; Soult's plans for the defence of the French Frontier; Wellington decides to advance into France; Instructions issued for the advance into France on the 7th October, 1813; The crossing of the Bidassoa; The attack on Vera and the Rhune Mountain; Some observations on the engagements, 7th to 9th October, 1813; Soult's view of the French situation after the Allied crossing of the Bidassoa; Wellington's plans for a further advance into France; Instructions issued relative to the advance of the Allied Army on 10th November, 1813; The Battle of the Nivelle; The attack of the Centre Corps; The attack of the right wing under Sir Rowland Hill; Some comments on the Battle of the Nivelle; The retreat of the French Army; The advance of the Allied Army; The army and the man; Order of battle of the Anglo-Portuguese Army and Spanish troops, October, 1813; Instructions re preservation of discipline during the advance into France; Fighting strength of the Anglo-Portuguese Army on 7th October, 1813; Strength of the Anglo-Portuguese Army under Wellington from June to November, 1813; Order of battle of the Army of Spain, 1st October, 1813; Index.

Reviewed by Major E.S. Johnston, Infantry

This book takes up the story of Wellington and the Peninsular Army in September, 1813, after Napoleon's great defeat in Russia. Wellington had ejected the French from nearly all of Spain, and was prepared to invade France. The book deals with the opening phases of the campaign of invasion.

With an army of about 100,000, opposed to about 75,000 French under Soult, Wellington's superiority depended upon his Spanish contingent of 50,000 men, which was always a doubtful factor. The remaining 50,000 were about equally British and Portuguese. Wellington was woefully short of money, supplies, and transportation, in the almost roadless frontier country. It was first necessary to consolidate his gains, mop up the rear area, and establish supply on a sound basis. Both armies entrenched themselves in great depth on a front of some twenty-five miles. The result, when the time came for Wellington's advance, was to forecast the conditions of stabilization of 1914-1918.

The two ensuing offensives emphasize a number of the same outstanding lessons which may be derived from the World War. Wellington, having only one army, which could not be replaced nor much enlarged, put an especial premium on the judicious expenditure of their means by all commanders. The utilization of field fortifications permitted economy of means on secondary fronts, where the enemy was nevertheless effectively fixed by feints, diversions, stratagems, and the shrewd exploitation of moral factors. This in turn permitted an increase in intensity of combat power on critical fronts. Secrecy was furthered by the most painstaking staff-work. Objectives were selected and routes of approach discovered or improved after a series of well-directed personal reconnaissances. Methodical preparations were made, so that the hostile position might be pierced, and success rapidly exploited. Unable to observe the entire battle, Wellington personally supervised the whole, but gave his especial attention to the critical area, where his personal intervention was decisive.

The two operations afford a valuable insight into the working methods of a very able commander, much straitened as to resources, who was now about to reap the results of years of effort in the fields of statecraft and generalship. Wellington had, himself, made his army what it was, and kept it in being. He was at this time at the height of his powers—a man of great political and military experience, marked administrative ability, strong and stable character, and piercing but flexible intellect—unquestionably combining most happily the qualities of the strategist, the tactician, and the leader.

The book is of interest to all officers, and especially to the G-2, G-3, and Command Sections of this School.

v.Clausewitz, General Carl.—**Vom Kriege.** [On war.] (With an introduction by Graf von Schlieffen) Edited by Karl Linnebach. Berlin, 1933—840 pp.....M 501-A.43

CONTENTS: Begleitworte; Vorwort zur zehnten Auflage; Zur Einführung der fünften Auflage; Vorrede zur ersten Auflage; Nachricht; Vorrede des Verfassers. Über die Natur des Krieges; Uber die Theorie des Krieges; Von der Strategie überhaupt; Das Gefecht; Die Streitkräfte; Verteidigung; Der Angriff; Kriegsplan; Anhang.
[The nature of war; Theory of war; Strategy; The battle; The forces; The defense; The attack; the plan; Appendices.]

Reviewed by Major C.A. Willoughby, Infantry

This military classic requires neither an introduction nor an apology. As a politico-military study, it ranks with the epochal speculations of Plato, Aristotle, Machiavelli, and Montesquieu. There is no similar treatment of the immense domain of military operations, against the background of strategic and political requirements; Clausewitz has not only furnished a brilliant series of essays, designed to clarify the complexities of operations, but he has gone far beyond, to a veritable philosophy of war. His object, when he started this work, "to straighten out the kinks in the brains of strategist and statesmen" has a modern application whenever policies are determined in that shadowy borderland between soldier and statesmen.

Apparently German military circles are still impressed with the significance of this work because the present edition is a reprint and contains forewords of approval by practically every military leader of prominence in present-day Germany.

> v.Hindenburg (27 February, 1933)—". . . The World War has merely confirmed the accuracy of Clausewitz' thought that war can not be waged 'with a light rapier' but only 'with a sword of battle raised in both hands and swung with every ounce of strength'."
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> v.Blomberg (Secretary of War), 18 February, 1933—". . . Far beyond evolution of systems and technical possibilities, Clausewitz' work still remains the basis for an intelligent development of the art of war. It is still able to define the nature of war and show its principles and internal structure."

There are similar comments from the pens of Fieldmarshals Mackensen, v.Bulow, Prince Leopold of Bavaria, Generals v.Kluck, v.Bothmer, v.Hotzendorf, v.Bohm-Ermolli, v.Beseler, v.Woyrsch.

Golovine, Lieut.General Nicholas N., Imperial Russian Army.—**The Russian Campaign of 1914.** The beginning of the War and operations in East Prussia. Preface by Marshal Foch. Translated by Captain A.G.S. Muntz, G.S., Indian Army. 1933—410 pp.....M 9403-J.47:4-R

CONTENTS: Foreword by Major General Stuart Heintzelman; Preface by Marshal Foch; Author's Preface. The beginning of the War; The first operations in East Prussia; Appendices.

Reviewed by Major R.C. Smith, Infantry

General Golovine combined, in a rare degree, the qualities of a trained historian with those of the experienced soldier. He has lectured and written on historical subjects in Russia, France, and the United States; he has commanded a cavalry regiment in battle; he has been an Army G-3, chief of staff of an army, and later, of a group of armies, all on active fronts. With this rich background he is peculiarly fitted to write the first account to be published in English, of the Russian point of view of operations in 1914 by the Russian First and Second Armies. Although it is based largely on unpublished Russian sources, the author's background of historical scholarship prevents this book from becoming a partisan account.

The open character of the fighting, the relatively small units that engaged in the operations, and the nature of the terrain, all combine to make this campaign of special interest for American military students.

This book has been ably reviewed by A.M. Nikolieff in the *New York Times Book Review* (15 April, 1934). He states in part as follows:

"Besides containing a description of the conditions under which the war began (Russia's military strength, the war plan, mobilization, etc.), the volume giyes the first detailed picture, as viewed from the Russian standpoint, of the campaign in East Prussia in 1914. Up to this time only German accounts of this campaign, which in the words of Major General Stuart Heintzelman in the foreword of the book 'has a vital military interest for American military students', or accounts mainly based on German source material, have been published. Those accounts, important as they are, differ widely from the picture and its study laboriously set forth by General Golovine on the basis of documents and descriptions by the opposing sides, and on many testimonies of the Russian participants in the campaign.

"In General Golovine's book, as in no other work, two important features of the East Prussian campaign, sometimes called the Tannenberg campaign (though it consisted of three battles—Gumbinnen, Tannenberg, and Masurian Lakes), are made exhaustively clear. They are the influence of policy on the Russian strategy and the true causes of the Russian catastrophe in East Prussia.

"Under the urgency of political influence, expressed in persistent requests from the French, the two Russian armies that invaded East Prussia took the field before completing their concentration, without the necessary transport echelons, with their lines-of-communications and signal service badly organized. In fact, the degree of disorganization in Samsonov's army (that which suffered the defeat), amounted 'to absolute confusion'. In spite of such an abnormal state of things, the strategic consequences of the invasion, namely, the transfer to the East, during the battle of the Marne, of two German army corps from the French front, were immense. 'These measures,' writes General Dupont, one of Marshal Joffre's colleagues, 'possibly were our salvation.'

"Among the non-political causes of the Russian reverse at Tannenberg, the strategic blunders of the commander of the two armies (the Northwestern Army Group) and their adverse psychologic effect on the leader of the defeated army played a most important part. These blunders, as well as the fluctuations, carelessness and 'strategic romanticism' of the Russian Higher Command in East Prussia, are disclosed by the author with merciless impartiality.

"Another important cause was the more than double superiority in fire strength of a German infantry division over a Russian infantry division. Owing to this fact, and contrary to German assertions, the fighting conditions on the battlefield were almost invariably unfavorable for the Russians. General Golovine, describing in detail the numerous engagements, convincingly shows that whenever the German infantry was not accompanied by a superiority over the enemy in artillery fire, no decisive success could be achieved by the German offensive. In these descriptions he also demonstrates how the Russian troops, fighting against heavy odds, some of the units suffering losses as high as 60 to 75 per cent, won the initial success (Gumbinnen), and later 'deferred the strategic catastrophe impending' again and again.

"Parallel to the disclosure of the faulty plan and inefficient conduct of operations on the Russian side, the author subjects the strategy of the Germans to a critical analysis. In the light of his criticism the German victories in East Prussia do not appear as brilliant as in their own presentations (such as those of Ludendorff, Francois, etc.). In addition, the skill of the German High Command is far from being as remarkable as it might seem, if the fact is taken into consideration that because of the interception of wireless messages sent by the Russian army headquarters unciphered, the Germans were well informed of the movements of the enemy.

"The book was originally published in Russian. The accuracy of the translation, revised to date, is beyond question."

Kawakami, K.K.—**Manchoukuo: Child of conflict.** 1933—311 pp.....M 9518

CONTENTS: Preface; Introduction; The storm gathers; Aggression or self-defense?; Enter Manchoukuo; Regionalism in Manchuria; "Wangtao," oldest ideal of the newest state; Henry Pu-yi, symbol of "Wangtao"; The government of Manchoukuo; Manchoukuo's helmsmen; The finances of Manchoukuo; Manchoukuo's foreign relations; Jehol and Barga, home of the Mongols; Solving the opium question; "Volunteers," rebels, bandits, "Squeezes"; The open door—is it closed?; The red shadow of Moscow; China at home; Index.

Reviewed by Major J.A. Doe, Infantry

In the preface, the author, the Washington correspondent of *The Tokyo Hochi Shimbun*, states the purpose of the book is to inform the world what Manchoukuo is—its organization, foreign relations, finances, its problems and difficulties. In fact, he touches lighly on these subjects.

The first third of the book deals with the need for Japanese expansion, difficulties with Manchurian authorities, the attack on, and defense by the Japanese troops along the South Manchuria Railway, 18 September, 1931, the Lytton Commission, the League of Nations. He then draws the surprising conclusion that Manchurian independence was due to the refusal of the League to allow direct negotiations between Japan and China, and a spontaneous independence movement in Manchuria. Later, in discussing the committee of six which proclaimed Manchurian independence, he states three of the members were former bandit leaders in the pay of Japan. The organization, foreign relations, and finances are discussed briefly. In theory the Chief Executive, Pu-yi, is all powerful, but the actual exercise of governmental powers are vested in a General Affairs Board of 135 officials, only 35 of whom are Manchurians or Chinese. Despite this, he states that when the League Commission accused Japan of aggression, of having set up a puppet government, Japan was put in a desperate position and was forced to recognize Manchoukuo.

The remainder of the book deals with the need of a central government in China, the opium question, the open door, and Communist movement.

Kenworthy, Lieut.Commander J.M.—**Sailors, statesmen and others.** An autobiography. London, 1933—318 pp...M 942-B92 (KE)

Reviewed by Major E.S. Johnston, Infantry

An autobiography, written early in life, in a moment of comparative calm in a busy career. The author left the British Navy in 1919, and served continuously in Parliament as a Liberal and Labor member until the Conservative victory in 1932 deprived him of his seat (for Hull) for the time being. To this political incident we are indebted for a most vivid and readable account of Commander Kenworthy's participation in the World War and in events, national and international, since that time.

The author was instrumental in assisting Mr. Lloyd George to effect a reorganization of the Admiralty in 1917, which inaugurated more aggressive action on the part of the British Navy. This was the beginning of the British Navy's General Staff, a body still lacking in our own navy. The author assisted in the preparation of the plans for the attacks on Ostend and Zeebrugge, which initially contemplated landings on the flanks and the utilization of tanks landed from specially equipped vessels, to reduce defenses from the rear. He still believes the changing of these plans to frontal attacks (without tanks) to have been a very costly error (p. 109).

The new Plans Division of the Admiralty recommended a mass torpedo attack across the intervening shoals and into the outer roadsteads of the German North-Sea ports. The Admiralty, however, reduced the

attacking force to a dozen coastal motor-boats instead of a large number. They also forfeited surprise by the injudicious selection of a base. The author compares this error to that of the Germans, with gas, and the British, with tanks, in throwing away surprise by initial use on too small and too unimaginative a scale (p. 110).

Commander Kenworthy pays tribute to the open-mindedness and professional keenness of the American Navy officers. It was only through getting the Americans to adopt, and prove the efficacy of, the depth-bomb, that he was able to induce his own service to adopt this excellent weapon (p. 113).

His comments on a flotilla of thirty large American motor-launches, operating in Gibraltar waters, are of interest as indicating their ready control by two-way voice radio, a method now being applied to land mechanized forces (p. 142).

Commander Kenworthy remarks that morale and discipline, while poor on the larger German ships surrendered after the armistice, were excellent on the smaller ones, where men and officers live in closer relations. He also tells a plain story involving the British government in the sinking of the German fleet by its own crews at Scapa Flow; the British Admiralty appears to have suggested this act to the German government and fleet, and to have connived at it, thus to forestall the outcome of the French and American demand that the surrendered fleet be divided up among the allied and associated nations. "*Our own Admiralty* (thus) *ended the war with a great and bloodless naval victory.*" (p. 146)

The author comments on the curious lack of decorations among the masses of front-line soldiers on leave, miserably making the channel crossing from France to England, as contrasted to four pages of small type in an issue of *The Times* announcing "a long list of war awards, mostly to embusqués, controllers of various departments, civil servants, war profiteers, and the rest of the home-front gang. For the first time I realized that war is not only a bloody, but a sordid, business, and that the people who suffer most from it get the fewest rewards" (p. 137):—a remark not without practical interest for soldiers interested in maintaining the morale and fighting spirit of armies.

The book is of interest to all officers, and especially to the G-2 Section of this School.

Nicolson, Harold.—**Peacemaking, 1919.** London, 1933—378 pp.
.....M 9403-C5-C.42

CONTENTS: Book I—As it seems to-day: Armistice; Delay; Misfortunes; Mistakes; Disorganisation; Quarrel; Compromise; Failure. Book II—As it seemed then: January 1—January 12, 1919. Contacts; January 13—January 20. Opening meetings; January 21—February 5. The Council of X; February 6—March 9. Committees; March 10—April 1. Coordination; April 1—April 9. Communist interlude; April 10—May 6. The dispute with Italy; May 6—May 20. 'Compensations'; May 20—June 28. The Treaty of Versailles. Index.

Reviewed by Captain F. During, Infantry

Mr. Nicolson has given us a picture of Europe of 1918-19 and of the peace conference itself. It is at once an indictment, a defense, and an explanation—above all, an explanation. The conference lives again in these pages. What we have before us is not a dry and meticulous record of events—but a reconstruction of "the unhappy and unhealthy atmosphere" of the conference. He has little to add to our knowledge of what happened, but he has much to offer on the propelling forces of events and the springs from which they emanated.

The author, being human, allows himself to fall into an extreme of criticism and denunciation of Woodrow Wilson, whom he holds chiefly responsible for Versailles. Yet one is not entirely convinced that it might not have been worse had not Wilson been there to make his effort, although Mr. Nicholson makes a strong argument for the opinion that the President would have been more effective had he stayed at home and directed the American delegation from the White House. For the delegation and its

experts, particularly for Colonel House, Mr. Nicholson has warm admiration. The President was much too bent on being the "prophet" and brooked no contradiction, particularly when compelled to reconcile the abandonment of his principles with his theocratic conscience. Worn out by the effort, he finally made his great surrender. That is how Mr. Nicolson sees Woodrow Wilson.

Much as one may admire the lofty impulses that move Mr. Nicolson in his bitter denunciation of Wilson, who like all others can not escape the judgment of history, one wishes that the author had tempered his severity by keeping in mind what he tells us he learned from Lloyd George, namely that "apparent opportunism was not always irreconciliable with vision."

Appended to the present work is Mr. Nicolson's diary of the peace conference, which adds much to the atmosphere he seeks to re-create.

As Mr. Nicolson sees it, the conference was doomed to failure from the start. He admits that "many fine things" were accomplished but argues that failure of the conference to satisfy higher hopes, the hopes aroused by Wilson and Wilsonism, was inevitable. On the other hand, he falls into the contradiction that the collapse of President Wilson was chiefly responsible.

The inevitability of failure Mr. Nicolson finds inherent not only in the circumstances already mentioned but also in the lack of preparation, faulty technical organization and methods, mode of procedure, and the long delay before getting down to business. All are discussed in great detail and summarized into a composite and highly illuminating picture. [*New York Times Book Review*, 17 September, 1933]

v.Oertzen, Colonel K.L.—**Rustung und Abrustung, 1934.** Eine Umschau über das Heer- und Kriegswesen aller Länder. [Armament and disarmament, 1934. Survey of the armies and military activities of all countries.] Berlin, 1934—303 pp.....M 205-A

CONTENTS: Verlauf der Abrüstungsberatungen im Jahre 1933; Berichte über das Heerwesen der einzelnen Staaten—Deutschland, Ausland; Übersicht über die Seestreitkräfte; Übersicht über die Luftstreitkräfte; Übersicht über Stärken und Ausgaben; Berichte über einzelne Zweige des Heerwesens.

[Result of the Disarmament Conference in 1933; The Armies of the World and the report on Navies and Aviation; Special report on the Different Arms.]

Reviewed by Captain F. During, Infantry

This book gives the armaments and military activities of all nations and is divided into three parts:

I—Result of the Disarmament Conference in 1933

II—The Armies of the World and the Report on Navies and Aviation

III—Special Reports on the Different Arms.

In Part I the author gives the events which lead up to Germany's withdrawal from the disarmament conference and the consequent withdrawal from the League of Nations.

Part II-A is a report of the military strength of forty nations. Part II-B contains a survey of the navies; Part II-C is a survey of air forces; and Part II-D is a comparative table of the strength of armed forces.

Part III contains reports on the several branches of the service and opinions in other countries relative to the next war.

This book is of value to the G-2 Section and of interest to every military student.

Otto, Lieut.Colonel Ernst.—**Der letzte Schwertstreich.** Die Abwehr der amerikanischen Maas-Argonnen-Offensive. [The last fight. The defense against the American offensive in the Meuse-Argonne.] Germany, 1932—222 pp.....M 9403-J.44:8U-51

CONTENTS: Beim amerikanischen Oberkommando in Ligny-en-Barrois; Bei der Heeresgruppe Gallwitz; Der erste Groszkampftag. (26. 9. 18); Der amerikanische Angriff geht weiter.

(27. u. 28. 9. 18); Mit General d. Kav. von der Marwitz zur Front (28. 9. 18); Der letzte Groszkampftag des ersten Abschnittes der amerikanischen Offensive. (29. 9. 18).
[At the American General Headquarters in Ligny-en-Barrois; With the Army Group Gallwitz; The first day of attack; The American offensive continues; At the front with General von der Marwitz; The last day of the first phase of the American offensive.]

Reviewed by First Lieutenant T. North, Field Artillery

By the introduction of a romantic counter-theme, Colonel Otto endeavors to popularize for German consumption the narrative of a losing battle; by way of added seasoning he praises the American troops with generalities to the obvious end of enhancing the achievements of the German defenders but disparages the French on all counts.

The mixture is hard to digest. The romance is amateurish; curiously it is separated into watertight compartments within the historical narrative. The conversations attributed to General Pershing and his staff are stilted for the purpose of animating the enemy background. There is the inconsistency of the praise bestowed in general terms upon the Americans, and a sharp criticism which covers most of their waking and sleeping hours.

Nevertheless, Colonel Otto's eminent qualifications as Chief of the Imperial Archives enable him to tell an absorbingly interesting story of the first three days of the Meuse-Argonne battle.

The St. Mihiel operation is the prolcgue. Here the Germans found our infantry brave but inexperienced, ignorant of the use of cover, but adroit in the employment of machine guns. The handling of our artillery was excellent from initial positions but lacked skill upon displacement. Leadership was poor, the use of a high proportion of officers being no substitute. In short, the American Army appeared to inspire no great alarm.

The American 2d and 89th Divisions are pungently criticized for failing to push forward from Thiancourt, where enemy resistance had disappeared.

In drawing his comparisons between the strengths of the opposing forces, Colonel Otto makes few errors at the expense of German accomplishment, placing the odds at St. Mihiel at five and one-half to one against the defenders. Again Colonel Otto finds that the Meuse-Argonne battle opened with an American infantry strength more than eighteen times that of the German; making due allowances for the author's zeal, it must be admitted that the enemy was outnumbered to a degree that ill accords with our popular conception of a German Army beaten man for man.

The story relates in some detail the daily experiences of each German unit; among the interesting high-lights are the virtual annihilation of a regiment by the American 4th Division which all but bagged the trains as well, the stopping of our tank attack near Varennes, the counterattack which threw back the American 35th Division at Montrebeau, the woeful traffic conditions which resulted from our artillery interdiction fires.

Colonel Otto paints what is probably an unflattering picture of our infantry which, through the first morning's mist, pushed forward in droves along the draws, leaving but a haphazard series of patrols to constitute the assault echelons; which droves very unfairly joined hands behind the Germans and isolated them. It is admitted that our artillery fire from initial positions was magnificently executed, due to careful preparation and excellent liaison, but again was incapable of exploiting success; the timely appearance of accompanying batteries would have doubled the confusion which reigned on the German side. The author dwells at some length upon the lost opportunities of the American 4th Division on 26 September and, by contrast, points out how a German would have profited by the chances offered to exploit the gap near Cuisy where the German resistance could have been rolled back from Montfaucon far to the north.

Colonel Otto lends the weight of his high authority to the contention, deprecated of late, that the retention of the Meuse-Argonne pivot was essential to the orderly withdrawal of the mass of the German armies; for this front alone were reserves to be made available by the High Command.

The book contains many interesting photographs and sketches; it has drawn largely upon other published sources, and new items of fact must be dug out of the irrelevant, or sententious. But to those to whom Meuse-Argonne is a personal memory there is much material that is distinctly worth while.

Riddell, Rt.Hon. Lord.—**Lord Riddell's war diary, 1914-1918.** London, 1933—388 pp.....M 9403-B4.42

CONTENTS: Preface; The eve of war; The first fourteen days; The press and the forces; The naval censorship; Balfour, Lloyd George, and others; Index.

Reviewed by Captain F. During, Infantry

Lord Riddell has been happily inspired to print his impressions substantially as he recorded them, though there are, he says, certain excisions.

Writing, as a diarist should write, for himself he has recorded his own part in conversations, and the reader is thus enabled to make whatever allowance is necessary for the personal factor. Lord Northcliffe's gloomy outlook in October, 1915, is of interest in view of the part he played in the events which led up to the formation of the Coalition Government in the previous May. His forecast was:

> This Government will be out in three months. It will be succeeded by a Committee of Safety, comprising perhaps five leading men. Later they will probably be turned out and then there will be a revolution. Another thing that may happen is a public exposure of the state of affairs in my newspapers.

By October, 1915, events still fifteen months distant were beginning to cast their shadows. Actually, of course, the problem before him was whether he himself should resign. He did in fact resign in November, 1915, on the question of the appointment of a War Council. By identifying himself with the Army Council on the question of man power, he made it inevitable that he should go the War Office on Lord Kitchener's death; and as Secretary of State for War he was bound to insist on effective Cabinet control of policy.

The steps by which he was driven to this position are carefully traced. In the first instance he was reluctant to take the War Office for fear of becoming a mere figurehead. He had, he said, no wish to interfere in military operations, but he must control the administrative departments. Satisfied in this regard and confident that he could work well with Sir William Robertson, he took office in July, only to find by October that the compromise would not work.

> My view is that at the present time we should strongly develop our artillery attacks, but never risk men unless we can take positions with light losses. They say this is a questions for soldiers alone. I don't agree. The whole situation must be reviewed. The soldier says: "It is our province to do the fighting; it is yours to supply the men." That is not my opinion. Furthermore, if the policy requires defence in Parliament or the country, I shall have to defend it.

Lord Riddell further makes it clear that the anxiety to avoid useless loss of life continued to preoccupy Mr. Lloyd George after he had formed his Government. The knowledge that the French casualties were lower than ours drove him to work for the unity of command, even at the price of a breach with Robertson. In January, 1918,

> he spoke strongly of the incompetence of the Higher Military Command. He said he had propounded two questions to them: (1) What were the respective forces of the Central Powers and the Allies? and (2) What plan had they to end the war? To neither were they able to give any satisfactory answer.

His ultimate reliance on Foch to answer the second question is supported by an unexpected piece of classical learning:

> I often think of Cicero's oration when it was proposed to send Pompey on a campaign. Cicero gave various reasons why Pompey would be a good commander and concluded, "and lastly he is favored by the gods." Some men are lucky and some unlucky. Foch, in addition to his other great qualities, is a lucky man.

There are also attractive details of more personal interest. For example:

> L.G.—I like a good bloodthirsty novel with penty of fighting and plenty of killing. I love Robert Louis Stevenson and Anthony Hope. I don't care for Jane Austen or Anthony Trollope and I don't care for George Eliot. I like Scott, but he is too long in coming to the point. I don't care for serious books nowadays; I have to read too many official documents.

By way of contrast, and also by way of doing justice to other figures who make vivid but less frequent appearances in Lord Riddell's pages, an indication of Arthur Balfour's literary taste may also be quoted:

> The talk turned on novels. A.B. had not heard of Mrs. Barclay of the Rosary fame, or of the renowned Charles Garvice, whose books sell more freely than those of any other novelist. I described the peculiar qualities of the authors, which interested Mr. Balfour very much.

No book invites quotation so persistently as a good diary. The variety and the brevity of its contents alike make impossible the more or less critical summary proper to a reviewer.

No War book of its kind is more illuminating than this in the attention which it directs to the importance of the work done by the country's great permanent officials. [*London Times Literary Supplement*, 8 June, 1933]

Santini, Captain Piero.—**Riding reflections.** London, 1933—125 pp.....M 403-G7

CONTENTS: Foreword; Preface; 'Schools' and the forward seat; Geometry of the forward seat; Contact vs. wings; Aids and jumping; Saddles; Bridles and Martingales; Controversy; Blue, red and yellow; The chace; Steeplechasing; Conclusion.

Reviewed by Captain W.B. Bradford, Cavalry

Since the close of the World War, many different works on the subject of hunters and jumpers, written mostly by Englishmen, have appeared in this country. Almost without exception, they have been rather mediocre in character, and have shown only a superficial understanding of present-day riding methods in vogue on the European continent. Some authors have attempted an interpretation of the "Forward Seat," and the Italian ideas of riding and jumping, but I fear they have fallen far short of their mark.

Now, however, there appears a new name on the list, carrying with it a very satisfying exposition of this much discussed, yet comparatively little known Italian system. Captain Piero Santini, of the Italian Cavalry Reserve, is a true deciple of Frederico Caprilli, the Italian officer who, from 1897 to 1907, revolutionized the then existing system of horsemanship in his country, and replaced it with a method of his own.

Caprilli, unfortunately, was little given to writing and has left no complete written account of his method. However, his ideas were thoroughly instilled into the schools of Pinerolo and Tor di Quinto, and since his death, have been carried forward from lip to lip by the instructors who had learned from him, and who succeeded him. Like Caprilli, few of these officers were writers, so it has been necessary either to attend these schools as students, as many American officers have done, or learn by hearsay. Consequently, grave misconceptions of the Italian system have arisen.

Santini studied under these instructors who learned from Caprilli. He is a sportsman of Italy, thoroughly conversant with the hunting, racing, and horsemanship contests of his country. He has travelled extensively, and knows American riders and conditions. At the instigation of Mrs. J. Van S. Bloodgood, ex M.F.H., he has written his *Riding Reflections* for the American public. This book, written by an Italian officer, is the first publication in English that I have encountered giving intimate and correct information of the teachings of Pinerolo and Tor di Quinto.

The author does not pretend to have presented a complete treatise on the subject of the Italian Seat, which indeed is *not* a seat, but a complete system of riding. But he discusses in excellent manner the geometry of the seat, the question of contact while riding and jumping, and the use of certain aids. He shows numerous drawings and photographs to illustrate his remarks, and has discussed many of these illustrations so well that they form a very important, integral part of his work.

Santini is primarily a devotee of hunting and out-of-door cross-country riding. He expresses himself in no uncertain terms concerning what he considers certain faulty characteristics of American horse shows. This, of course, is a matter of opinion, but I am sure that he is correct in principle, radical though some of his assertions may seem. I consequently commit his *Reflections* not only to the attention of those actively engaged in riding, showing, racing, and following the hounds, but especially, for thoughtful study and consideration, to those members of our Hunts, Steeplechase, and Horse Show Associations who have the responsibility. If our methods are faulty, Santini at least is constructive in his criticism, and he points in the direction of progress.

Shreve, Royal Ornan.—**The finished scoundrel.** General James Wilkinson, sometime Commander-in-Chief of the Army of the United States, who made intrigue a trade and treason a profession. 1933—319 pp.....M 973-B92 (WI)

CONTENTS: Meet General Wilkinson. "As the Twig is Bent—": He goes to war; Understudy to a hero; 'During a convivial hour'. "—The Tree Inclines": El Brigadier Americano; The Spanish conspiracy; 'Back to the Army again'; The Spanish grip relaxes; Truth and candor resume their empire. "This Conjunction of Malign Planets": Burr, Wilkinson, mystery; General Wilkinson writes to the President; General Wilkinson saves the country; General Wilkinson saves himself; John Randolph starts something; 'The Alpha and Omega of the Prosecution'; The final raid on the Spanish treasury. The Honor of a Soldier: The first coat of whitewash; Apples, flour, fever and politics. The Acquitted Felon: The disciples of Gates; To the Church of San Miguel. Bibliography; Index.

Reviewed by Captain F. During, Infantry

In the opening chapter Wilkinson's entire career and personality is prejudged, without allowance or explanation. The uninformed reader has no recourse but to accept Randolph's dictum, that "Wilkinson is the most finished scoundrel that ever lived."

Wilkinson's career and personality is, in many respects, among the most extraordinary to be found in the annals of American history. Without money, at first, and without influential friends or social position, Wilkinson was a general officer before he was 21 and Commander-in-Chief of the United States Army before he was 40.

For a period of over forty years, extending from the beginning of the American Revolution until the close of the War of 1812, Wilkinson's name is associated with most of the important events of American history. He was with Washington at the siege of Boston, and again at Valley Forge and Morristown; he was with Gates at Saratoga. He was a leader in the early settlement and development of Kentucky, second in command to Wayne in the Indian campaigning that broke the backbone of the Indian opposition to the settlement of the Western lands. On Wayne's death Wilkinson was advanced to the command of the army and continued as such, with an interval of two years, almost until the beginning of the War of 1812.

Wilkinson sent Pike off on his expeditions of exploration; he was a suspected principal in the Burr conspiracy; he was one of the commissioners who received the Louisiana Purchase from the French. At the beginning of the War of 1812 he took Mobile from the Spaniards and then came north to the Canadian border to wreck what little military reputation was left to him. The closing years of his life were spent in writing his voluminous and verbose *Memoirs*, in managing his plantation on the Mississippi below New Orleans, and then, in the City of Mexico, adjusting claims of American citizens entrusted to him and in negotiating, on his own account, a large grant of land on what is now the site of Galveston, Texas. He died in Mexico before he could fulfill the conditions of the grant and is buried in an unmarked grave beneath the little church in the parish of San Miguel.

Wilkinson's life ran the whole gamut from poverty to riches and back again. He reached the heights of power and fame—both good fame and ill fame; he sunk to the depths of degradation and obloquy. He was the subject of more military courts-martial and Congressional courts of inquiry, and the beneficiary of more direct Congressional legislation, than has been the lot of any officer in the army of the United States.

Wilkinson was shrewd, cynical, and untrustworthy, but he always halted at the brink of overt treason. He was a man of undoubted ability, but he was sadly lacking in character.

He took the oath of allegiance to Spain, while a private citizen of Kentucky, but this meant nothing of itself as "It was the usual practice . . . for Owners & Boat Crews" trading with New Orleans, to render this lip-service to Spain as a condition of entry.

Wilkinson continued his Spanish connections after Kentucky had joined the Union and he had again become an officer of the United States Army. Perhaps he did not know how to break them off and save himself and his associates; or he thought he could continue them clandestinely, taking what profit from them that might come his way.

The book brings together in narrative form the accepted account of Wilkinson and his career. [*New York Times Book Review*, 19 November, 1933]

Whitbeck, Ray H., and Thomas, Olive J.—**The geographic factor —its role in life and civilization.** 1932—422 pp.....M 910-A

CONTENTS: Preface; Acknowledgements; List of illustrations; The operation of geographic influences; The adaptation of organisms to their environment; Man's adjustment to his planet; The four "spheres" of the geographic environment; Climate and man; Climate and its economic relationships; Geographic factors in the growth of civilization; The importance of geographical location with special reference to cities; Available materials and human progress; The revolutionizing influence of coal; The international importance of the location of petroleum fields; Rivers and valleys and their service to man; Man's adjustment to plains; Geographical barriers and human activities; Man's adjustments to restrictive environments; Island life and insularity; Environment, racial character, and religious beliefs; Geographical influences in the forming of American national character; Adjustments to the world environment—Examples from South America; General bibliography; Index.

Reviewed by Major E.S. Johnston, Infantry

An informative and very readable book on the influence of environment, especially the factors related to geography, on mankind. The discussions of agriculture and industry are illuminating, and include an estimate of the situation of the United States as a World Power from the standpoint of natural resources. The book is of interest to all officers, and especially to the G-2 Section of this School.

Wortham, H.E.—**Chinese Gordon.** 1933—384 pp.....M 942-B92 (GO)

CONTENTS: Preface; Prologue. Youth and the Crimea (1833-1860); China (1860-1864); The imitation of Christ (1865-1873); Equatoria (1874-1876); Governor-General of the Sudan (1877-1879); The knighterrant (1880-1883); Khartoum (1884-1885); The aftermath; Index.

Reviewed by Major J.A. Doe, Infantry

A new biography of Gordon, based to a large extent on Gordon's own letters to his sister Augusta, letters hitherto not available to his numerous biographers. It is a well written and interesting account, depicting a colorful soldier in a colorful era of British imperialism.

The reader may find the long account of Gordon's religious struggles and fanaticisms tedious, despite the fact that these struggles and convictions motivated nearly all of Gordon's actions. Of interest to the military student are his relations with civil authority, various provincial governors, British and foreign, and with the British Government. The book contains numerous arresting observations, such as Gordon's at Sebastopol when it states it "may be the last of modern sieges according to the old rules," and by the author, "It showed some lack of humor on the part of the War Office that a soldier who had just brilliantly proved mobility to be the supreme factor in war, should be entrusted with the supervision of the defenses then being built at the entrance to the Thames."

Zimmermann, Erich W.—**World resources and industries.** A functional appraisal of the availability of agricultural and industrial resources. 1933—842 pp.....M 009-D

CONTENTS: Foreword; Background and perspectives; The resources of agriculture and their utilization; The resources of industry and their utilization; Foreground and prospectives; Bibliography; Index of authors; Index of subjects.

Reviewed by Major T.J. Hanley, Jr., Air Corps

Although the author disclaims encyclopedic thoroughness in this book, it is a detailed and complete survey of major industries and agriculture in their relation to human needs.

Professor Zimmermann emphasizes that raw materials are important only in their relations to individual wants. "A manless universe is void of resources, for resources are inseparable from man and his wants. They are the environment in the service of man."

Part IV (two chapters) deals with conservation of resources and economic nationalism.

One need not agree with Professor Zimmermann's economic, political, and social ideas to derive a great deal of information from this work.

The book is of interest to students of industrial mobilization and military geography.

Section 7

LIBRARY BULLETIN

BOOKS ADDED TO THE LIBRARY SINCE MARCH 1934

Alexander: **Always a Grand Duke.** 1933 [947-B92 (AL)]

Allen:

Anthony Adverse. 1933 [813]
Toward the flame; a war diary. 1934 [M 9403-B4.73]

American Foundation: **The United States and the Soviet Union.** A report on the controlling factors in the relation between the United States and the Soviet Union. 1933 [327.73 (.47)]

American year book, 1933. 1934 [973.916]

Berdahl:

Disarmament and equality. 1932 [M 004-D]
The policy of the United States with respect to the League of Nations. 1932 [M 9403-C7-G5]

Besse: **Gaskampf und Gasschutz.** [Gas war and gas defense.] 1933 [M 423-J4-A.43]

Black: **Our unknown Constitution.** (Understandably written for the layman.) 1933 [342.73]

Blanco: **The journey of the flame.** Being an account of one year in the life of Senor Don Juan Obrigón known during the past years in the three Californias as Juan Colorado and to the Indiada of the same as The Flame. 1933 [979.4]

Canadian Annual Review of Public Affairs, 1933. 1933 [971]

Clifford: **Too many boats.** 1934 [M 9403-B3-F]

Commerce, Dept. of:

Fifteenth census of the United States: 1930. Agriculture. Vol. IV—General report, statistics by states. 1932 [310]
Commerce year book, 1933. 1934 [M 009-D1]

Congress: **Catalogue of the public documents of the Seventy-first Congress and of all departments of the government of the United States for the period from July 1, 1929 to June 30, 1931.** 1934 [328.734]

Croce: **History of Europe in the nineteenth century.** (Translation from the Italian by Henry Furst.) 1933 [940.0]

Crowther: **Outline of the universe.** 1931 [523]

Culmann: **Reichsheer and militias; their structure and strategical employment.** (Translation from the French) 1933 [M 205-C.43-B]

Dahlin: **French and German public opinion on declared war aims, 1914-1918.** 1933 [M 9403-C1-A]

Dennett: **John Hay: From poetry to politics.** 1933 [973-B92 (HA)]

Dictionary of American Biography. Vol. XIII: Mills—Oglesby. 1934 [973-B920]

Duane: **A handbook for infantry.** Containing the first principles of military discipline, founded on rational method; intended to explain in a familiar and practical manner, for the use of the military force of the United States, the modern improvements in the discipline and movement of armies. 1813 (rare volume) [M 404-G.73]

Eddington: **Expanding universe.** 1933 [523]

Eisenhart-Rothe: **Deutsche Infanterie.** [German infantry.] 1933 [M 9403-G4-C.43]

Encyclopaedia of the Social Sciences. Vol. 12: Partnership—Punishment. 1934 [303]

Federal Digest. 1933 annual, covering volumes 61-66 Federal, Second series, 1-4 Federal Supplement, 53 Supreme Court Reports. 1934 [345.5]

Federal Reporter, second series. Vol. 67 (2d), November 1933-February 1934. 1934 [345.41]

Fishman: **Military chemistry.** A guide for the commanding personnel of the Red Army. [M 615]

Foreman: **Advancing the frontier, 1830-1860.** 1933 [M 973-Q1-A.73]

France. Ecole Superieure de Guerre:

Conferences d'Infanterie, Ecole Superieure de Guerre, 1931-1932. [Infantry conferences, Ecole Superieure de Guerre, 1931-1932.] (2 vols.) 1932 [M 209-C.44-D4E]

Le corps d'Armee. [The Army Corps.] 1932 [M 209-C.44-D4E]

La Division. [The Division.] (3 vols.) [M 209-C.44-D4E]

France. Ministere de la Guerre:

Artillerie. Instruction technique sur la protection contre les gaz de combat. [Artillery. Technical instruction for the protection against gas in combat.] 1930 [M 407-J3-D]

Artillerie. Instruction technique sommaire sur la protection contre les gaz de combat. [Artillery. Summary of technical instruction for protection against gas in combat.] 1929 [M 407-J3-D]

Instruction sur la figuration des feux. [Instruction in the computation of fire.] 1929 [M 407-H1-D]

Instruction provisoire technique sur le camouflage. [Provisional technical instruction on camouflage.] 1927 [M 503-C3]

Manuel de montagne et d'Alpinisme militaire. [Manual of mountain warfare.] 1932 [M 503-B5]

Reglement des unites de chars legers. 1re partie: Instruction technique. 2e partie: Combat. 3d partie: Service en campagne. [Regulations for light tank units. 1st part: Technical instruction; 2d part: Combat; 3d part: Service in campaign.] 1932 [M 405-J4]

Garbedian: **Major mysteries of science.** 1933 [500]

Great Britain. Committee of Imperial Defence: **History of the Great War based on official documents.** Military operations, France and Belgium, 1914. Mons, the retreat to the Seine, the Marne and the Aisné, August-October 1914. (New and revised edition) 1933 [M 9403-E4-D.42-C]

Great Britain. War Office: **Field service regulations.** Vol. I: Organization and administration, 1930. Vol. II, Operations, 1929. 1930 [M 506-A4.42]

Grosze Brockhaus. Vol. 17: Schra—Spu. 1934 [034.3]

Hedin: **Riddles of the Gobi Desert.** (Translation from the Swedish) 1933 [950]

Hendricks: **The Federal debt, 1919-1930.** A chapter in American public finance. 1933 [336.73]

Hindus: **The great offensive.** 1933 [947-A]

His: **A German doctor at the front.** (Translation from the German) 1933 [M 9403-G21-C.43-A]

Holbrook:

Minnesota in the Spanish-American War and the Philippine Insurrection. 1923 [M 97389-F5-C.776]

Minnesota in the war with Germany. Vol. II. 1932 [M 9403-F5-C.776]

St. Paul and Ramsey County in the war of 1917-1918. 1929 [M 9403-F5-C.776]

Hulbert: **Overland to the Pacific.** Vol. I: Zebulon Pike's Arkansaw journal: in search of the southern Louisiana purchase boundary line. Vol. II: Southwest on the Turquoise Trail. The first diaries on the road to Sante Fe. 1932 [978]

Interstate Commerce Commission: **Statistics of railways in the United States for the year ended December 31, 1932.** 1934 [385.73]

Iwanow: **Kurze Zusammenstellung uber die Russische Armee.** [Short synopiss of the Russian Army.] 1929 [M 203-C.47]

Japan year book, 1933. 1933 [315.2]

Johnstone: **Robert E. Lee, the Christian.** 1933 [M 9737-E4-C.75-B92 (LE)]

Kansas, State of: **1933 supplement to revised statutes of Kansas 1923 (cumulative).** 1934 [345.22 (.781)]

Knight: **Georgia's bi-centennial memoirs and memories.** A tale of two centuries, reviewing the state's marvelous story of achievement since Oglethorpe's landing in 1733. 1934 [975.8]

League of Nations:

Conference for the reduction and limitation of armaments. Conference documents. Vol. I (1932.IX.63) 1932 [M 004-D]

Conference for the reduction and limitation of armaments. Report submitted to the Bureau of the prohibition of chemical warfare and violations of the prohibition to use chemical, bacteriological and incendiary weapons. 1932 [M 004-D]
Statistical yearbook of the League of Nations, 1931-32 and 1932-33. 1933 [M 104-A6]
The verdict of the League. China and Japan in Manchuria: The official documents with notes and an introduction. 1933 [M 9518]
World economic survey, 1932-1933. 1933 [330]

Lindley: **The Roosevelt revolution: First phase.** 1933 [973-A]

Lippmann: **The United States in world affairs.** An account of American foreign relations, 1932 and 1933. 1934 [327.73 (A)]

Longworth: **Crowded hours.** Reminiscences. 1934 [973-B92 (LO)]

Military medical manual. A text and reference book of army medical training. (With questions for self-examination.) 1931 [M 421-J1-A.73]

Minnesota. War Records Commission: **Minnesota in the World War.** Vol. I: History of the 151st Field Artillery, Rainbow Division. 1924 [M 9403-F5-C.776]

Mitchell: **Army engineering.** 1933 [M 604-A]

Monkhouse: **Moscow, 1911-1933.** Being the memoirs of Allan Monkhouse. 1933 [947-A]

Naval War College: **International law situations, with solutions and notes, 1932.** 1934 [M 007-C5]

Nickerson: **Can we limit war?** 1933 [M 004-A]

Nicolson: **Peacemaking, 1919.** 1933 [M 9403-C5-C.42]

Norton: **The coming of South America** (El Resurgimiento de Sud America). 1932 [M 980]

O'Conroy: **The menace of Japan.** 1934 [M 952]

Oxford English dictionary supplementary volume. 1933 [423]

Oertzen: **Rustung und Abrustung, 1934.** [Armament and disarmament, 1934.] 1934 [M 205-A]

Parisot: **La protection contre le danger aero-chimique.** [The protection against the danger of aero-chemical warfare.] 1932 [M 503-C6]

Political handbook of the world, 1934. Parliaments, parties and press. 1934 [354]

Pollard: **China's foreign relations, 1917-1931.** 1933 [327.51]

Powell: **Slanting lines of steel.** 1933 [M 9403-B4.73]

Quigley: **An introductory syllabus on Far Eastern diplomacy.** 1931 [950]

Roberts: **Rabble in arms.** A chronicle of Arundel and the Burgoyne invasion. 1933 [M 9733-J:77-C2]

Roosevelt: **On our way.** 1934 [973-A]

Rothschild: **Lincoln: Master of men.** A study in character. 1906 [973-B92 (LI)]

Shreve: **The finished scoundrel:** General James Wilkinson, sometime Commander-in-Chief of the Army of the United States, who made intrigue a trade and treason a profession. 1933 [M 973-B92 (WI)]

Signal School:
Tactics and technique of signal communications for infantry. 1933 [M 404-D7]
Reference data and tables of organization. 1933 [M 411-C.73-E]

Simonds: **America faces the next war.** 1933 [M 004-D]

Snow: **The Far Eastern front.** 1933 [M 9518]

Spiesz: **Minenwerfer-fibel.** [Minenwerfer primer.] 1933 [M 614-D5]

Stoltzenberg: **Experimente und demonstrationen zum luftschutz.** [Experiments and demonstrations for protection against aerial gas attacks.] 1933 [M 503-C4]

Stotherd: **Sabre and saddle.** 1933 [M 942-B92 (ST)]

Strom: **Worterbuch fur die Waffen-, Munitions- und Sprengstoffindustrie unter Einschlusz des Kriegsbedarfes.** Deutsch—englisch—franzosisch—spanisch. [Dictionary for the arms, munitions and explosives. German—English—French—Spanish.] 1933 [M 202-R.43]

Tannenbaum: **Peace by revolution.** An interpretation of Mexico. 1933 [M 972]

Treasury Dept. Bureau of the Budget: **Standardized government travel regulations as amended, January 30, 1934.** 1934 [M 211-C.73-C3]

Unofficial Observer: **The new dealers.** 1934 [973-A]

Urban: **Kurze Zusammenstellung uber die Tschechoslowakische Armee.** [Short synopsis of the Czechoslovakian Army.] 1934 [M 203-C.437]

Vauthier: **La defense anti-aerienne des grandes unites.** [Antiaircraft defense of large units.] 1929 [M 503-C6.44]

Voisin: **La doctrine de l'aviation francaise de combat** (1915-1918). [The French doctrine of combat aviation.] 1932 [M 409-J1-C1.44]

Wallace: **America must choose.** The advantages and disadvantages of nationalism, of world trade, and of a planned middle course. 1934 [973-A]

War Department:

Annual report of the Chief of Engineers, U.S. Army, 1933. (2 vols.) 1933 [M 410-C.73-D]

Report on the Air Corps command and staff exercises of 1933 by the Commanding General, GHQ Air Force (provisional.) With a critique. 1933 [M 409-J1-C.73]

Who's Who 1934. An annual biographical dictionary with which is incorporated men and women of the time. 1934 [942-B920]

Zimmerman: **Die Tarnfibel.** [Camouflage primer.] 1933 [M 503-C3]

Zimmermann: **World resources and industries.** A functional appraisal of the availability of agricultural and industrial resources. 1933 [M 009-D]

Section 8

READERS' GUIDE AND SUBJECT INDEX

List of Periodicals Indexed

and

Key to Abbreviations

A&N Jour—Army & Navy Journal

A&N Reg—Army & Navy Register

AN&AF Gaz—Army, Navy & Air Force Gazette (Great Britain)

A Ord—Army Ordnance

A Quar—Army Quarterly (Great Britain)

Bul Belge Mil—Bulletin Belge des Sciences Militaires (Belgium)

Can Def Quar—Canadian Defence Quarterly (Canada)

Cav Jour—Cavalry Journal

Cav Jour [GB]—Cavalry Journal (Great Britain)

Cav Sch ML—Cavalry School Mailing List

CA Jour—Coast Artillery Journal

Es e Naz—Esercito e Nazione (Italy)

FA Jour—Field Artillery Journal

Ftg Forc—Fighting Forces (Great Britain)

Inf Jour—Infantry Journal

Jour R Art—Journal Royal Artillery (Great Britain)

Jour RUSI—Journal of the Royal United Service Institution (Great Britain)

Jour USII—Journal of the United Service Institution of India (Great Britain—India)

MC Gaz—Marine Corps Gazette

Mil Mitt—Militärwissenschaftliche Mitteilungen (Austria)

Mil-Woch—Militär-Wochenblatt (Germany)

Mil Eng—Military Engineer

Mil Surg—Military Surgeon

Nav Inst Proc—Naval Institute Proceedings

QM Rev—Quartermaster Review

Rev Ej Mar—Revista del Ejercito y de la Marina (Mexico)

Rv d'Art—Revue d'Artillerie (France)

Rv de Cav—Revue de Cavalerie (France)

Rv F Aer—Revue des Forces Aériennes (France)

Rv d'Inf—Revue d'Infanterie (France)

Rv Gen Mil—Revue du Génie Militaire (France)

Rv Mil Fran—Revue Militaire Francaise (France)

Riv Art e Gen—Rivista di Artiglieria e Genio (Italy)

Roy AF Quar—Royal Air Force Quarterly (Great Britain)

RASC Quar—Royal Army Service Corps Quarterly (Great Britain)

Roy Eng Jour—Royal Engineers Journal (Great Britain)

Roy Tk C Jour—Royal Tank Corps Journal (Great Britain)

SC Bul—Signal Corps Bulletin

Wr & Wf—Wehr und Waffen (Germany)

Ws & Wr—Wissen und Wehr (Germany)

Cur Hist—Current History

For A—Foreign Affairs

For Pol Rep—Foreign Policy Association: Foreign Policy Reports

Jan—January
Feb—February
Mar—March
Apr—April
May—May
Jun—June
Jul—July
Aug—August
Sep—September
Oct—October
Nov—November
Dec—December

A

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